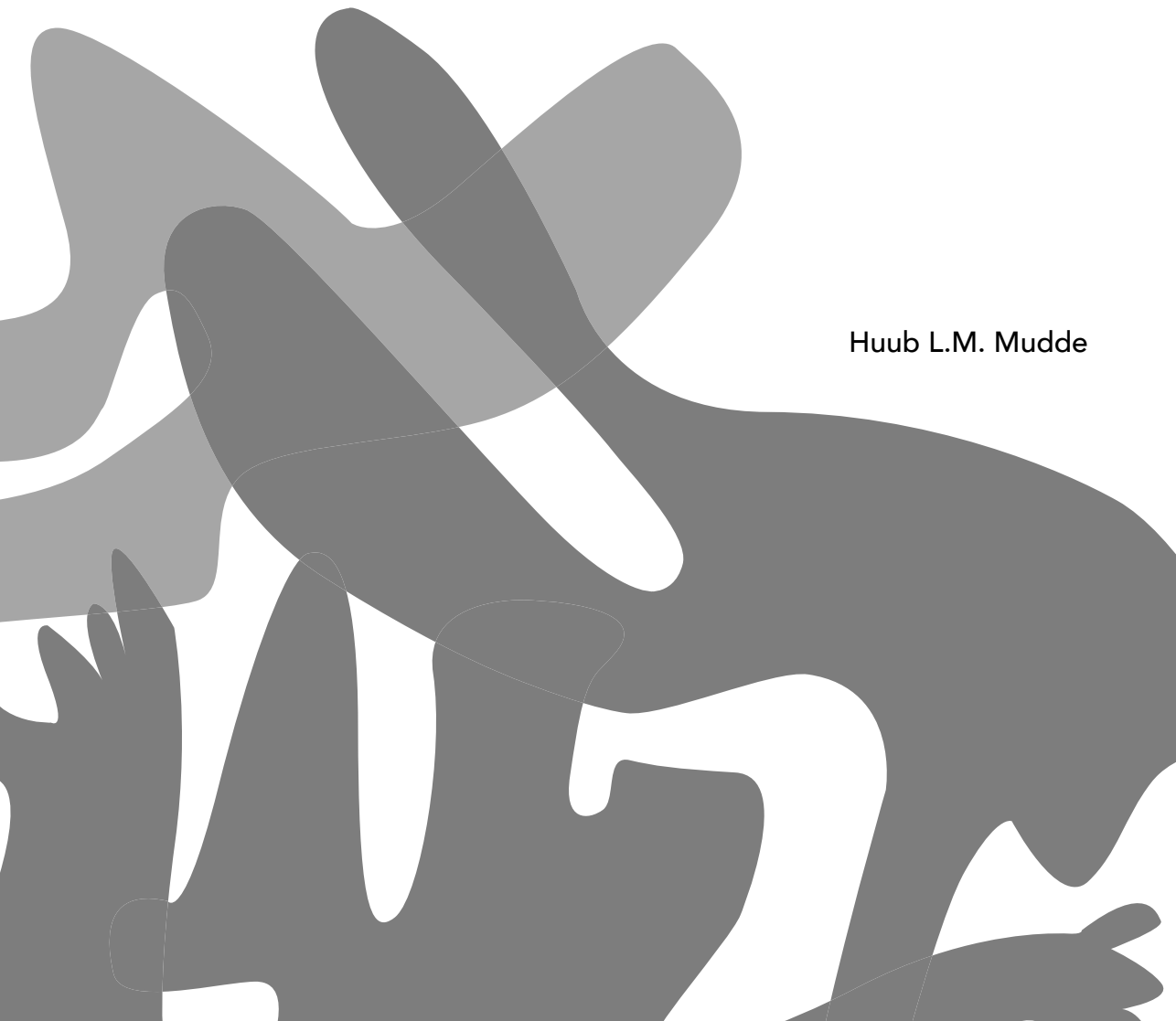
Universities in the midst of society

UNIVERSITIES IN THE MIDST OF SOCIETY

Entrepreneurship and youth employment in Ethiopia, Indonesia and the Palestinian Territories



Huub L.M. Mudde

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Universities in the midst of society:
entrepreneurship and youth employment in Ethiopia, Indonesia and the Palestinian Territories

DISSERTATION

to obtain the degree of Doctor at Maastricht University,
on the authority of the Rector Magnificus, Prof.dr. Rianne M. Letschert
in accordance with the decision of the Board of Deans,
to be defended in public
on Thursday 16 April 2020, at 14:00 hours

by
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The second country of my study, Ethiopia, is an astonishing beautiful and intriguing country but not easy when you want to do research. The country is vast with challenging infrastructure: visiting towns outside capital requires flying or travelling many hours by car. Internet is not reliable and even telephone – the best way of connecting people – is not always working. The support of many helpful people made it possible for me to do my research.

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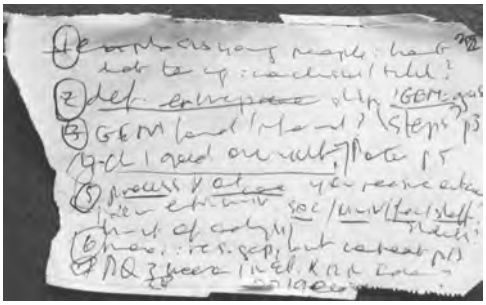

Last, I want to honour the people who are the dearest to me, my wife and my three children. My wife Mattanja Coehoorn, for her unflinching trust in me that I could do this PhD. All these years she gave me the space to work on my PhD. It must have been pretty boring that I was sitting upstairs reading and writing, only coming down for a cup of coffee. But perhaps even more important is that Mattanja is my safe haven. She allows me to literally fly away and to come back to the nest. Thanks for your inspiration, your love, and for sharing so many precious moments with me. Probably the most precious of these moments have been and still are with my children. With my daughter Afke, socially and creatively gifted, who designed the cover of this dissertation. And with my two beautiful sons, Jippe and Menno, who were willing to be paranymph at my public defence: I am proud that you are on my side.

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First and foremost Leo Marie Mudde, my father, a highly intelligent technical engineer. He may have been the spark of my interest for developing countries, because he was born in Bandung (before the Indonesian independency from the Netherlands) and because of his work in India and Mexico. The latter was evidenced by a soapstone Taj Mahal and sombreros as physical tokens in the house of my youth. My father got ill too young, had difficulty to connect emotionally and to communicate with his four children. Probably, he was damaged

because of war traumas in his youth. However, he was the only father I had, for me still a mystery, but the foundation of my existence.

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Huub

List of Abbreviations

ABGC	Academician-Business-Government-Community
ACEEU	Accreditation Council for Entrepreneurial and Engaged Universities
AfDB	African Development Bank
ANNU	An-Najah National University
AQU	Al Quds University
BSc	Bachelor of Science
BHMN	Badan Hukum Milik Negara - State-Owned Legal Entity
BLST	Bogor Life Science and Technology
BSC	Balance Score Card
CEO	Chief Executive Officer
CIA	Central Intelligence Agency
EBSCO	Elton B. Stephens Co
EDC	Entrepreneurship Development Centre
ETH	Ethiopia
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
FTE	Fulltime Equivalent
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GEDI	Global Entrepreneurship and Development Institute
GEI	Global Entrepreneurship Index
GEM	Global Entrepreneurship Monitor
GEUM	Global Entrepreneurial University Metrics
GERA	Global Entrepreneurship Research Association
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH - German development Agency
GVA	Gross Value Added
HU	Hebron University
ICDF	International Cooperation and Development Fund, Taiwan
ILO	International Labour Organisation
IND	Indonesia
IP	Intellectual Property
IT	Information Technology
IPB	Institut Pertanian Bogor – Bogor Agricultural University
LEED	Local Economic and Employment Development Programme (of the OECD)
MAS	Palestine Economic Policy Research Institute
MSc	Master of Science
MSM	Maastricht School of Management

MSMEs	Micro, small and medium enterprises
NABIC	Business Innovation & Partnership Center of the An-Najah National University
NCEE	National Centre for Entrepreneurship in Education in Coventry, United Kingdom
NEET	Not in Employment, Education or Training
NIRAS	NIRAS International Consulting
NUFFIC	Dutch organisation for internationalisation in education
ODA	Official Development Aid
OECD	Organisation for Economic Co-operation and Development
OPT	Occupied Palestinian Territories
PCBS	Palestinian Central Bureau of Statistics
PESTEL	Political, Economic, Social, Technical, Environmental, Legal
PhD	Doctor of Philosophy
PTUK	Palestinian Technical University Kadoorie
QS	Quacquarelli Symonds
RAE3	Business ideation programme of Palestinian Technical University Kadoorie
TEA	Total early-stage Entrepreneurial Activity
TRL	Technology Readiness Level
UIIN	University-Industry International Network
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation
USA	United States of America
UT	University of Twente
VNSU	Vereniging van Universiteiten - Association of Dutch universities
VU	Vrije Universiteit Amsterdam – Free University Amsterdam

Preface

In my professional work and educational career, I have always been focusing on external relations and networking in developing cooperation. Graduated as sociologist at Wageningen University with a specialisation in communication, I was taught the social interface concept[1] of Norman Long, who at that time was head of the Department of Non-Western Sociology. This resulted in a field research on the interaction between extension workers and tenants in a rural settlement in Costa Rica (Mudde, 1990). I concluded that the most successful farmers were those who managed to make best use of knowledge and opportunities gained from a wide network.

In any situation I try to give meaning to organisational behaviour from an external perspective: what are the developments in society that justify the existence of and plans of any institute? How to plan, strategise, and market businesses or services to meet the needs in society? This interest and approach came together in my work at Maastricht School of Management (MSM) as manager of several projects in support of higher education institutes in developing countries and emerging economies. Central to all these projects is strengthening the relevance of the respective universities for the socio-economic development of their countries. This is where the notion of entrepreneurial university comes in and this study started.

[1] A social interface is a 'critical point of intersection between different life worlds, social fields or levels of social organization, where social discontinuities based upon discrepancies in values, interests, knowledges and power, are most likely to be located' (Long, 2001)

Chapter 1

Introduction

Background

Universities, as leading institutions of teaching and learning, have a wide socio-economic role. They are regarded as important 'engines of economic growth and social change' (Foss and Gibson, 2015), among other things providing highly knowledgeable and skilled manpower. In this role, universities educate people in preparation for a position in the labour market. However, many countries in Africa and the Middle East face the challenge of creating employment for their predominantly young population. A substantial number of graduates do not find a job at all. Even a position that matches the level of their education is hard to find. This labour market mismatch results in graduates ending up as taxi driver or waitress just to name a few examples. The absorption capacity of the labour market is not (yet) big enough for this youth: the public sector has its limits with often (relatively) low salaries and the (formal) private sector is underdeveloped, in particular in regions further away from capital. Youth employment has thus become a priority area of concern by many, including governmental donor agencies.

Youth employment

This priority is understandable because by 2030 an estimated 77 per cent of all young people in the world (aged 15–24) will live in Africa, Asia and the Pacific (ILO, 2017). Although the unemployment rate of youth on a global scale remains more or less stable at 12 per cent, it is about three times as much as among adults and major differences exist among regions (see table 1). In particular, in Northern Africa and the Middle East the unemployment rates are high, 30.1 and 20 per cent respectively. In Sub-Saharan Africa, the youth unemployment rate is lower, an estimated 9.8 per cent in 2019, but on the rise.

In Africa, the most youthful continent, insufficient employment opportunities are being created for the expected 170 million new labour market entrants between 2010 and 2020 (Nagler and Naudé, 2014); only three million formal jobs are created annually (AfDB, 2017). For example, in Ghana, around fifty percent of the graduates were still unemployed after two years being graduated, in South Africa around one third of the labour force being unemployed, and in Nigeria up to 80 per cent of the graduates had difficulty in finding a job (Owusu-Ansah and Poku, 2012). Thus, it is essential that universities act pro-actively to facilitate a good transfer of their graduates to an evolving labour market.

Another critical issue related to youth employment is the quality of employment. The International Labour Organisation (ILO, 2017) reports that many young people in emerging and developing countries find work in the informal economy with associated low and insecure income. Data indicate that in developing countries 19 out of the 20 young women and men are in informal employment (ILO, 2017). This situation is pictured in ILO's labour market update of 2017 on Asia and the Pacific (ILO, 2017b). The ILO reports that youth

unemployment (aged 15-24) in Asia and the Pacific was estimated ten per cent in 2017, which is just below the global average. However, ILO reports as well that employment growth was weak and that young people continue to face difficulties in finding stable jobs (ILO, 2017b). Nearly half of the labour force in the developing economies of Asia and the Pacific are self-employed or work at a (small-scale) family business, which usually relates to informal, less secure employment.

A related indicator that gets increasing attention is the NEET rate: the proportion of youth (aged 15-24) Not in Employment, Education or Training. NEET can be associated with marginalisation and exclusion of youth (Elder, 2015) as it captures young people who are unemployed, unavailable to work due to a variety of reasons, discouraged, or have chosen not to work or study. Globally, it is estimated that 21.4 per cent of youth are NEET (ILO, 2018) of which the overarching majority are women. The latter relates to gender inequalities in access to education and the labour market due to social and cultural norms (ILO, 2017).

Table 1: Youth unemployment trends and projections, by region, 2017 – 2019 (aged 15-24)

	Unemployement rate (%)			Unemployment (millions)			NEET (%)		
	2017	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
World	**12**	**11,8**	**11,9**	**60,3**	**59,3**	**59,1**	**21,2**	**21,2**	**21,4**
Africa	**12,1**	**12**	**11,9**	**13,0**	**13,1**	**13,3**	**21,4**	**21,5**	**21,5**
Northern Africa	30	29,9	30,1	3,4	3,4	3,4	26,6	26,8	26,9
Sub-Saharan Africa	9,9	9,8	9,8	9,5	9,7	9,9	20,4	20,4	20,4
Americas	**15,2**	**14,9**	**14,9**	**12,1**	**11,7**	**11,7**	**19,2**	**19**	**19,1**
Latin America and the Caribbean	18	17,9	17,8	9,7	9,6	9,5	21,5	21,5	21,5
Northern America	9,4	8,5	8,7	2,4	2,1	2,2	13,7	13,2	13,5
Arab States	**19,9**	**20,1**	**20**	**1,7**	**1,7**	**1,7**	**29**	**29,1**	**29,2**
Asia and the Pacific	**10**	**10**	**10,1**	**26,3**	**25,9**	**25,8**	**22,4**	**22,5**	**22,7**
Eastern Asia	10,1	10,1	10,1	9,1	8,8	8,6	16,2	16,2	16,4
South-Eastern Asia and the Pacific	9,9	10	10,2	5,5	5,5	5,6	17,9	18	18,2
Southern Asia	10	9,9	9,9	11,6	11,6	11,6	27,4	27,5	27,6
Europe and Central Asia	**16,3**	**15,5**	**15,4**	**7,2**	**6,7**	**6,6**	**14,2**	**14,1**	**14,3**
Northern, Southern and Western Europe	17,3	15,9	15,4	3,7	3,4	3,3	11,2	10,8	10,7
Eastern Europe	15,9	14,7	14,2	1,6	1,4	1,3	13,1	13,3	13,9
Central and Western Asia	15	15,3	16,3	1,9	1,9	2,0	20,4	20,4	20,9

Source: ILOSTAT, Accessed 11 March, 2019

Table 1 reports about the youth unemployment and the NEET rate in the different regions in the world in 2017, 2018 and 2019 (estimate). It shows that in Northern Africa and in the Arab States both rates are high, and that the NEET rate is also high in Southern Asia. Furthermore,

the ILO figures indicate that 50.3 mln. unemployed young people live in Africa, the Middle East, Asia and Latin America, which is 85 per cent of all unemployed young people globally.

Entrepreneurship

In reaction to the disadvantaged situation of youth as pictured above, entrepreneurship is stimulated globally by governments, civil society, private sector and education institutions as an instrument for employability and economic development (Röpke, 1998; European Commission and OECD, 2014). Aggregated data on country level on the status of entrepreneurship are published by the Global Entrepreneurship Monitor (GEM). GEM presents data on entrepreneurial behaviour and attitudes of individuals as well as on the national context that is perceived to be relevant for entrepreneurship. In its Global Report 2017-2018, GEM (2018) categorises these data by region and by low, middle and high-income countries. Almost two-third of the working-age population (aged 18-64) in low-income countries perceive starting a business as a good career choice (versus 57 per cent in high-income countries). In Africa, this is even higher: 76.2 per cent. However, less than 40 per cent of the 18-64 aged adults in Africa think that there will be a good opportunity for starting a business within the next six months, versus 61.9 per cent in North America.

In addition, GEM measures business activity using the Total early-stage Entrepreneurial Activity (TEA). This GEM indicator represents the percentage of the working-age population (aged 18-64) who are either a nascent entrepreneur or owner-manager of a new business. In low-income countries, this rate is 16.4 per cent. The highest TEA rates are in Latin America, the Caribbean and in North America (almost 20 per cent); the lowest rates are in Europe (8.1 per cent).

Furthermore, GEM measures the expected contribution to job creation. Most of the entrepreneurs in low-income countries expect to stay small without additional workers. Only 11.3 per cent expect to create six or more jobs. For entrepreneurs in high-income countries this percentage is twice as high. Categorised by region, the United States of America (USA) score highest (38.6 per cent), followed by Asia and Oceania (21.0 per cent) and Europe (18.5 per cent). In Africa, 17 per cent of the entrepreneurs expect to create six or more jobs within the next five years (GERA, 2018).

In a special report on youth entrepreneurship (Schøtt, Kew and Cheraghi, 2015), GEM highlights differences among regions. Relevant to mention is that youth in Sub-Saharan Africa has a very positive perception on their entrepreneurial competence, is more likely to know start-up entrepreneurs than in other regions, and that some 50 per cent of all young African people surveyed had the intention to start a business. The latter coincides with a high prevalence of necessity-motivated enterprises, which is also the case among young

entrepreneurs in the Middle East. Furthermore, the report stresses that job creation by young entrepreneurs is very limited.

Work experience and education

It is not easy for a young person to become a successful entrepreneur. Young people are less likely to be successful because they have less experience, smaller networks, and most of the time less financial means (Schoof, 2006; Brixiová, Ncube and Bicaba, 2015; Staniewskia and Awruk, 2015). Business performance and age are positively related (Rai, 2008; Verdugo, 2018; Kirogo, Nyaboga, Marwa, Nyaanga and Waiguchu, 2018). A recent study in the USA (Azoulay, Jones, Kim and Miranda, 2018) showed for instance that the average age of the owner of a successful start-up is 45. Successful entrepreneurs are those people that have high level of human capital, gained through experience and education (Van Praag and Van Stel, 2013). This is confirmed by Lafontaine and Shaw (2016) in their study on serial entrepreneurs in the USA. They concluded that the more successful businesses – measured by the number of days that an establishment stays in business – are run by owners with prior business experience.

Despite the importance of work experience and based on the notion that entrepreneurship can be learnt (Lazear, 2004, 2005; Hessels, Brixy, Naudé and Gries, 2014), universities started to offer courses about and for entrepreneurship. In doing so, universities aim to stimulate graduates to become job creators instead of job seekers, because 'higher level of entrepreneurship and more effective innovation are perceived to be the key engines of economic growth' (Dugassa, 2012).

Providing education 'about' entrepreneurship is not the same as education 'for' (or how to become) an entrepreneur. The first type of education is analytical and focuses on the results of research explaining why people start an enterprise and may become successful or not. The second type of education focuses on what it takes to become an entrepreneur. There are textbooks on this topic, but the real question is: How do you make the necessary steps to start your own business? How do you solve the issues of finding a location, personnel, obtaining orders or acquiring finance if necessary? It is understood that you cannot learn this from a textbook. This requires – beyond the mentioned work experience – interactive teaching methods: learning by doing.

It also requires business development services, helping a nascent entrepreneur finding the right technology, to obtain the necessary permits and credit and to obtain services, such as accounting services, tax advice and suggestions how to export. In a course *on* entrepreneurship, a student may study business development as a topic and gain knowledge how to organise a business support system. In education *for* entrepreneurship, students are actually using business development support for creating an enterprise.

A third type of entrepreneurship education can be identified as teaching 'through' enterprise, which is about practicing and stimulating enterprising behaviours and attributes (Gibb, 2013): entrepreneurial education.

For a university to become successful in terms of entrepreneurial graduates, more is needed than entrepreneurship education. Entrepreneurship education only pays off if the institute itself is entrepreneurial (Röpke, 1998; Kirby, 2006), in vision, strategy, structures and organisational rules, (human) resources and work processes, and culture and values (Fayolle and Redford, 2014). The question is how universities in developing countries cope with these challenges of preparing their students for employment. How entrepreneurial are they?

This dissertation is about the entrepreneurial characteristics of universities in developing countries, in particular in Ethiopia, Indonesia, and Palestine, exploring why some universities are more entrepreneurial than others. It is based on the notion that an institute needs to be entrepreneurial for being able to fulfil its role in a rapidly changing environment (Gibb, Haskins and Robertson, 2009, updated 2012). It is based on the understanding that a university needs to have societal relevance, as is formally stated in mandates of universities globally (for instance referred to as 'community service'). This is the rationale for the title of this dissertation: 'Universities in the midst of society: entrepreneurship and youth employment in Ethiopia, Indonesia and the Palestinian Territories'.

It is important to note that being entrepreneurial is a choice. A university can decide to be a disciplinary academic institute focusing on fundamental research, a so-called 'mode 1' university in which a university is an independent space for discovery and learning (Gibb *et al.*, 2009, updated 2012). Some scholars however state that transformation of the traditional research and teaching university into an entrepreneurial university is a necessity, a point of view derived from the notion that science (as the source for innovation) and the economic system of society need to be linked to each other in a structural manner (Röpke, 1998).

In the remainder of this chapter, first a general overview is given on the most relevant theoretical concepts and debates. Subsequently, the research aim, questions and methodology are presented, and the next chapters introduced.

Theoretical starting point

Entrepreneurship and economic development

Before focusing on the concept of entrepreneurial university, it is important to make explicit which interpretation will be used for the entrepreneurship concept. Ample literature exists on this, focusing on entrepreneurs and entrepreneurship development whether in developed or developing countries. According to Schumpeter (1934), entrepreneurs are innovators who use a process of shattering the status quo of the existing products and services to set up new products or new services. An entrepreneur can also be defined as someone who is specialised in making judgmental decisions about the allocation of scarce resources (Casson, 1982).

In this dissertation, the definition of Kuratko and Hodgetts (2004) is used, who define the entrepreneur as *'an innovator or developer who recognizes and seizes opportunities; converts these opportunities into workable/marketable ideas; add value through time, effort, money, or skills; assumes the risks of the competitive marketplace to implement these ideas; and realizes the rewards from these efforts'.*

There are no single and universally accepted definitions of *entrepreneurship*. 'Entrepreneurship', and thus the associated competences and skills, is frequently used in the dual meaning of being 'enterprising' as well as starting-up and running a business (Gibb, 2002; European Commission and OECD, 2014). The terminology of 'enterprising' person is used for someone who possesses entrepreneurial skills but does not own his or her business (Blenker, Dreisler and Kjeldsen, 2006). An 'entrepreneurial' person may possess the same entrepreneurial skill set, but in addition is owner of a business venture. They are entrepreneurs in the strict sense of business owners. According to Drucker (2009), entrepreneurship is defined as 'a systematic innovation', which consists in the purposeful and organised search for changes, and it is the systematic analysis of the opportunities such changes might offer for economic and social innovation. In a more simple definition, entrepreneurship is about people in their role as the identifier and exploiters of opportunities (Acs, 2006). GEM (2018) limits entrepreneurship to new business creation or the expansion of an existing business. In this study, a broad definition of entrepreneurship is used beyond the traditional association with business solely. It also encompasses 'intrapreneurship', which simply can be defined as 'entrepreneurship within an organisation' (Menzel, 2008). Entrepreneurship is defined as the tendency to create value through identification and exploitation of opportunities. This includes starting and managing one's own business (Shane and Venkataraman, 2000). The value that is created can be financial, cultural, or social (FFE-YE, 2012).

The relation between entrepreneurship and economic development is a complicated one. It is too simple to just state that entrepreneurship leads to economic growth. In general

terms one could postulate that entrepreneurship can be important for economic growth and development (Röpke, 1998; Gries and Naudé, 2009; European Commission and OECD, 2014) as it leads to start-up and continuation of new business. However, Shane (2009) extensively explains that the overarching majority of entrepreneurs hardly contributes to economic growth. He even argues that 'countries that have consistently faster economic growth, actually have declining rates of new firm formation' (p143). In addition, Shane clarifies that only a very small number of high-growth start-ups account for most of the wealth and job creation, which is confirmed in recent studies (Block, Fisch and Van Praag, 2018). He thus argues to only incentivise these 'gazelles'. Last, following Shane's argument that unemployed people are more likely to start a business than people that already have a job (because of lower opportunity costs), entrepreneurship is a valid alternative in countries with a large young, unemployed population, like in Africa and the Middle East. Expectations on economic growth as a result of these start-ups should however be tempered.

Porter's characterisation (1990) of national competitive development helps to understand the relative importance of entrepreneurship in different economies. He categorises three types of countries, in 2006 complemented by two intermediate transition stages (Lopez-Claros, 2006). First, low-income countries like Ethiopia and Palestine are labelled as factor-driven economies. These are economies that compete primarily through low costs of production – often based on natural resources - and a supply of low value-added products. Typically, the economy is characterised by high rates of agricultural self-employment as well as a large number of small manufacturing and service firms. Entrepreneurship development is thus important for fostering this self-employment and setting up small and medium sized businesses. The role of the government is among others to provide stability and enable sufficiently free markets (Porter, Sachs and McArthur, 2002). Porter stresses that for a national productivity to grow, it is essential to export in industries with high and rising levels of productivity (1990:545). Secondly, investment-driven economies (middle-income emerging markets like Indonesia) are countries that have efficient production techniques in large markets, and are able to scale-up economic activities. The role of large firms increases because of industrialisation and economies of scale, whilst self-employment is declining. Capital and labour are key drivers for productivity growth. Thirdly, knowledge, or innovation-driven economies (like the Netherlands) are characterised by innovation-based growth and higher value-added economic activities. The role of the entrepreneur as a disruptive innovator (Schumpeter, 1942) is central. These economies can also be labelled as entrepreneurial (Audretsch and Thurik, 2001), characterised by high uncertainty and an increased role of new and small enterprises.

It is in a context of increased perceived importance of entrepreneurship for economic development that higher education institutions globally are expected to provide 'thinking, leadership and activity to enhance entrepreneurship capital' (Audretsch, 2014:320).

Universities are challenged to provide knowledgeable and skilled young entrepreneurs that are considered to contribute to the creation of knowledge-based enterprises (Frank, 2007; Coyle, Gibb and Haskins, 2013). They are offering entrepreneurship education with the aim to develop an entrepreneurial mindset of students and to prepare them in start-up a business (Gibb, 2013). The background of this view is that in the dynamic, fast changing world of today, employability requirements overlap with competencies and skills associated with entrepreneurship, like opportunity identification, initiative taking, networking, strategic thinking, and self-efficacy (Coyle *et al.*, 2013; Moberg, 2014). Entrepreneurial skills are considered as essential for young people to become successful in the twenty-first century (Obschonka, Hakkarainen, Lonka and Salmela-Aro, 2017). This broad vision of the importance of entrepreneurship in modern society is reflected in the entrepreneurship competence framework EntreComp (Bacigalupo, Kampylis, Punie and Van den Brande, 2016). This framework with 15 competencies builds on the idea that entrepreneurship is a key competence for all citizens that can be learnt, applicable to all spheres of life.

Entrepreneurial universities

In the extant body of literature, the first publications referring to entrepreneurial universities are from the 1980s. These publications are from and about the USA, and situated in a context of increased competition for research funding and attention for entrepreneurship in society. In 1983, Etzkowitz (1983) elaborates in his paper on entrepreneurial scientists how university faculty members are commercialising their research through formation of firms and collaboration with corporations. He pictures a development that universities are becoming enterprises able to generate income out of their research activities and frames such institutions as being entrepreneurial.

Bjork (1985) presents a case study of the University of New Mexico highlighting how the university managed to position itself as a research institution and attracting external support. A report of a study visit in 1985 to the USA by 12 European university leaders shows that also in Europe the interest for entrepreneurship was on the rise. Under the title 'The Entrepreneurial and Adaptive University', the report indicates that the administrators were interested in the ideological and practical implications from a movement toward entrepreneurialism (Davies, 1987). This interest was arisen because of rapid social and economic changes affecting the universities, such as the relation with industry, adequacy of existing financial resources, and a changing and larger student population.

The few articles in the 1990s on entrepreneurial universities focus on the changing role of American and European universities in technology commercialisation and economic development. Wasser (1990) is critical about the direction and far-reaching implications of universities becoming entrepreneurial. He predicts an identity crisis with universities losing their intrinsic legitimacy, becoming financial dependent on industry, justifying their existence

solely in contributing to the economy, becoming more bureaucratic, and with increased attention for engineering and technology at the expense of the humanities. Smilor, Dietrich and Gibson (1993) are more neutral, contending that a shift to a more entrepreneurial university is irreversible, because universities have to respond to environmental changes of increased global competition. They characterise an entrepreneurial university by a more direct involvement in technology commercialisation and a more proactive approach to regional economic development with implications for education (more problem solving oriented) and university management.

The current thinking on entrepreneurial universities is grounded in a few influential publications, all published in 1998. Röpke (1998) states that transformation of the traditional research and teaching university into an entrepreneurial university is a necessity. He bases this on the notion that knowledge creation and dissemination is essential for innovation, which in turn is fundamental for economic development. He refers to Schumpeter (1934), who stated that 'the embodiment of new knowledge in the process of innovation is the core function of entrepreneurship'. Röpke poses that for knowledge to be applied in a product or service, the founders of this knowledge (faculty and students) must become entrepreneur. He argues against knowledge transfer, because *'technology transfer works only if together with the knowledge the people themselves are transferred'* (Röpke, 1998: p11). Therefore, he advocates that 'a university, which sees a main task in being a transfer agent, cannot be an entrepreneurial university'. The logical conclusion he draws from this is that to make a university entrepreneurially successful, it is needed to 'create among its members, especially students, the will and ability to start their own business' (p113). For faculty, staff and students to become entrepreneurs, Röpke claims that the university itself needs to become entrepreneurial in order to *'increase wealth and create employment by incorporating new knowledge in innovative products and technologies'* (p9).

Etzkowitz (1998), in his study among American universities, emphasises in his entrepreneurial university concept the relations with industry. With reference to the first academic revolution in the nineteenth century when research became part of the university function next to education, he pictures a second revolution in which universities are incorporating economic and social development as part of their mission. In his view, entrepreneurial universities are those universities that are able to generate significant income by raising venture capital funds through commercialising academic research. Etzkowitz poses that this *'capitalisation of knowledge'* is the heart of a new mission for the university. An entrepreneurial university is closely linked to users of knowledge and is becoming *'an economic actor in its own right'* (1998: p833). In his view, an entrepreneurial university can be defined through five interrelated characteristics (Etzkowitz, 2004):

- Capitalisation: beyond adding to the academic disciplinary knowledge base, academic knowledge is contributing to economic and social development, and as such strengthening the links between university and society;
- Interdependence: there is an intensive interrelation with industry and government;
- Independence: given the interdependence, the university operates in its own right, as independently as possible;
- Hybridisation: hybrid organisational formats are being created meeting the academic needs as well as the close relations with external parties (for instance research centres, network institutes, and incubators);
- Reflexivity: the university structure is becoming more dynamic, reflecting the continuously changing relations with industry and government.

According to Etzkowitz (2004), the lever for becoming more entrepreneurial as university is the increased interaction with industry and government, which he coins as Triple Helix. He states that this interaction shapes the conditions for innovation in a knowledge-based economy. Central to the Triple Helix approach is the blurring of boundaries between the traditional institutional spheres of government, industry and universities, with each assuming roles of 'the other' (Etzkowitz and Leydesdorff, 2000; Etzkowitz, 2003). In this way, the relationships among the institutional spheres of the university, industry and government are continuously reshaped in an endless transition resulting in new technologies, new firms and new types of relationships in a sustained and systemic effort.

Clark (1998) presented a multiple case study of five European universities in which he introduced a different meaning to the same concept. Entrepreneurial are according to Clark those academic institutions that are agile, able to position themselves in a competitive sector, with increasing demands but fewer resources through traditional governmental funding. Central to Clark's stand is the transformation of government-sponsored universities to a more independent status. He poses that universities need to change due to changing funding base, increased demands from government to support in solving social and economic problems, the changing labour market with more knowledge-based enterprises, hence other requirements for graduates, and more and different type of students. Entrepreneurial are those universities that are able to transform in order to meet the ever-changing demands in society. Change, complexity and uncertainty are endemic to an entrepreneurial university.

According to Clark, in the entrepreneurial university concept, institutional entrepreneurship can be seen as both a process and an outcome. He stresses that transformation needs collective action of groups within the institution, which can be by faculty, students, and administration. Clark postulates that entrepreneurial universities are characterised by: 1) a strengthened steering core, 2) an expanded developmental periphery, 3) a diversified funding base, 4) a stimulated academic heartland, and 5) an integrated entrepreneurial

culture. Clark (2004) concludes that his model of five characteristics is a proven pathway for universities to become more autonomous and self-reliant. Furthermore, he stresses the importance of an institutional will to change, which he labels 'institutional volition'. This as 'an emergent act of will in the form of a decision to pursue a certain path of development' (p93). Differently stated in the context of entrepreneurial universities, institutional volitions are collective decisions of groups within the university resulting in collective commitment for entrepreneurial change.

Although Clark and Etzkowitz approach the entrepreneurial university differently, both have identified similar characteristics of entrepreneurial university, in particular the importance of interaction with society (industry and government), independency in decision-making, and the need of all members of the university to be involved and supportive to an entrepreneurial culture (Etzkowitz, Bikkulov, Kovaleinen, Grey, Leitner and Poutanen, 2017).

In the last 15 years, the number of publications on entrepreneurial universities increased exponentially. Of 101 peer-reviewed articles on entrepreneurial universities indexed in two EBSCO databases, 92 articles were published after 2003 (Cai, Mudde, Reyes and Weng, 2017). Attempts to define the entrepreneurial university in the literature have not reached consensus (European Commission and OECD, 2012). The common denominator however is the recognition of a change from traditional universities as institutions of production and dissemination of knowledge through research and education to academic institutions with a stronger public service role, contributing to economic growth and innovation (Fayolle and Redford, 2014), enhancing and facilitating entrepreneurial behaviour (Audretsch, 2014). Table 2 presents an overview of different characteristics of the entrepreneurial university, compared with the traditional university and an entrepreneur.

Table 2: Characteristics of the entrepreneurial university, compared with the traditional university and an entrepreneur

The individual level of an entrepreneur	The traditional university	The entrepreneurial university
Exploration of new business opportunities	No business activities	Balancing business opportunities with education and research
Disrupting the present practice	Reinforcement of the present practice	Innovation rooted in academic practice
Revolutionary change	Evolutionary change	Change as leading principle
Uncertainty acceptance	Uncertainty avoidance	Managing of uncertainty
Long-term orientation to the future	Short-term orientation to the present	Long-term orientation to the future
Flexibility, room to maneuver	Planning and formalisation of activities	Bottom-up initiatives and new mechanisms and business units
Visionary and intuitive decision-making	Decision-making influenced by politics	Entrepreneurial vision and decentralised entrepreneurial targets
Holistic approach	Functional expertise	Multi- and transdisciplinary
Compensation depending on venture success	Compensation based on academic performance	Compensation matching individual performance and institutional interests

Source: based on Menzel, 2014

Gibb is among the more influential European scholars on entrepreneurial universities with thousands of citations. He brings the entrepreneurial university concept to the centre of higher education, away from a narrow focus on commercialisation of knowledge and entrepreneurship taught by business schools (Gibb, 2002). Central to his view is that entrepreneurial implies being able to cope with high levels of uncertainty and complexity and that this is applicable both on individual as well as organisational level (Gibb *et al.*, 2009, updated 2012).

Universities face many challenges that require an entrepreneurial response, such as: funding of mass student entry, concerns with employability of graduates, expectations to contribute to local, regional, and national economic development, knowledge transfer, globalisation and competition among higher education institutions, and digitalisation (Gibb *et al.*, 2009, updated 2012; European Commission and OECD, 2012; Coyle *et al.*, 2013; Gibb, 2013). Building on the different approaches and definitions as presented in literature, Gibb introduces a broad entrepreneurial university concept (2013:p1), which is used in this dissertation:

> *'An academic organisation designed to contribute effectively to the enhancement of learning in a societal environment, characterised by high levels of uncertainty and complexity: empowering its staff and students to demonstrate enterprise, innovation and creativity in research, teaching and pursuit and use of knowledge across boundaries: and dedicated to creating public value via a process of open engagement, mutual learning, discovery and exchange with all stakeholders in society, local, national and international.'*

Subsequently, Gibb proposes a framework for exploration of entrepreneurial university development. The five areas of this framework are: Strategy, Governance, Organisation and Leadership; Knowledge Exchange; Stakeholder Relationship Development and Partnership (local, regional, national and international); Enterprise and Entrepreneurship Education; and Internationalisation (Gibb, 2012). This framework has been the basis for an assessment tool developed by the OECD (Organisation for Economic Cooperation and Development) and the European Commission named HEInnovate (European Commission and OECD, 2013).

In the growing body of literature, there are critics on the entrepreneurial university. Nelles and Vorley (2010) and Gibb *et al.* (2009, updated 2012) state that the thinking on entrepreneurial university is mainly rooted in empirical evidence with weak theoretical underpinning, exemplified by the work of Clark and Etzkowitz. In addition, studies on the relation between context and development of entrepreneurial university transformation are scarce (Foss and Gibson, 2015). This is remarkable, because the interaction with the context in which the university operates is fundamental for the entrepreneurial university concept. In other words, the extent to which a university is entrepreneurial is to be understood within a specific context (Gjerding, Wilderom, Cameron, Taylor and Scheunert, 2006). Furthermore, an internationally agreed set of indicators measuring entrepreneurial universities does not exist (Etzkowitz, *et al.*, 2017). This is because of the variety of interpretations and manifestations of entrepreneurial university, which hampers comparison among universities. In Turkey (Gür, Sinemden and Özlem, 2017) and in Brazil (Almeida, Plonski, Axelberg, Baeta, Terra and Simões, 2018), national indices have been developed, combining qualitative and quantitative indicators. Another critique is about the dominance of the economic, business-oriented interpretation in the discourse on entrepreneurial university. This dominance is contested, with a plea to focus on the wider societal role of universities (Audretsch, 2014; Cai and Lui, 2015; Goddard and Kempton, 2016). Last, studies on entrepreneurial universities have taken largely the university as unit of analysis or the individual scientist. From the notion that a university is an entirety of many units, Rasmussen, Mosey and Wright (2014) state that more attention is needed for focusing on department level to help explain differences within a university.

Last, in the Netherlands for example, the attention for entrepreneurial universities has culminated in the concept of valorisation. This is defined as '*the process of creating value from knowledge by making knowledge suitable and/or available for economic and/or societal use by translating knowledge into useful products, services, processes and entrepreneurial activity'* (Landelijke Commissie Valorisatie, 2011: p8). The Netherlands association of universities (VSNU) strongly stimulates valorisation at all the Dutch universities. As an example, Maastricht University operationalises this among others by requiring an essay on valorisation as compulsory component of each PhD thesis (see appendix seven).

Summarising, diverse ideas and developments are brought together under the entrepreneurial university concept, but all rooted in a Western, knowledge-economy context. One stream, derived from the ideas of Etzkowitz, refers to research-based universities contributing to economic development and innovation. A focus on patents, spin-offs, industry-funded research and Triple Helix comes with this approach. A second stream, grounded in Clark's empirical work, puts emphasis on universities entrepreneurially coping with uncertainty and thus on organisational change. In this study, the second perspective is chosen, because it aligns with the broader role of universities in an increasingly entrepreneurial society (Audretsch, 2014). An entrepreneurial university is an academic institution that is able to cope with the changing nature of knowledge society, to prepare students for a global labour market, to engage with government, private sector and civil society, to contribute to social as well as economic local and regional development, to foster innovation, to demonstrate relevance to national and international competitiveness agendas, and to ensure future funding and autonomy.

Entrepreneurial universities in developing countries

As explained above, the origin of entrepreneurial university and, as a logical result, the majority of literature is about higher education in knowledge-based economies, in other words high-income countries. Only recently, the attention for entrepreneurial universities is more global with contributions from and about universities in developing countries. Of the 101 peer-reviewed articles on entrepreneurial universities indexed in two EBSCO databases (Cai *et al.*, 2017), 26 articles were about higher education in Africa, Asia, Latin America or Central/Eastern Europe, of which 23 published in 2005 or more recently. The ten Asian articles included three articles on universities in high-income countries Singapore, Hong Kong and South Korea. Six articles were about higher education in Africa, of which four on South Africa.

The societal role of universities is the essence of several of these articles. Ceptureanu (2017), Saeed, Muffato and Yousaf (2014) and Amadi, Philips, Chodokufa and Visser (2016) focus on entrepreneurship education – in Romania, Pakistan and South Africa – among others as a way to mitigate youth unemployment through strengthening entrepreneurial skills or intentions. A cross-cutting conclusion is the need for more cooperation with entrepreneurs, industry, government, and NGOs for entrepreneurial skill development of the students. Furthermore, Saeed *et al.* (2014) conclude in their study among Pakistani students that students lacked support in how to set-up a business, which they explain by the novelty of entrepreneurship education in the country and possibly restrictive orientation on entrepreneurship by the faculties at these universities.

Grobbelaar and De Wet (2016) and Subotzky (1999) propose alternatives to the concept of entrepreneurial universities, which they perceive too much biased towards economic

development. Grobbelaar and De Wet advocate for 'development universities' that are concerned to create solutions for concrete problems of society. They illustrate this with a South African case study. Center stage in the framework that they propose for analysing how universities operationalise a development role are relationships with local communities. They state that academic contributions of universities should be valued by the engagement of these universities with the community. Their framework is in essence a flow chart picturing institutional change in relation to changes in the external environment. Characteristics of this framework are on the level of key goals and nature of the university, its functions, policies, and obstacles and barriers, like political support and level of autonomy of the university. Although the framework that Grobbelaar and De Wet propose is helpful as illustration of aspects of a transformation process, it is generic without any indications on how to measure such transformation.

Subotzky published his article on higher education in – as well – South Africa a few years after Mandela was released out of prison, at a time of rebuilding South Africa after apartheid. He stresses the role of universities as contributors to the public good and to a more equitable society. He advocates for university – community partnership development as alternative for business oriented entrepreneurial university. Also Sooampon and Igel (2014), in their case study among Thai university researchers, emphasise the role of universities in fostering social equality. They propose universities to be social enterprises rather than profit-making organisations, framing the entrepreneurial role of researchers as leaders for social change. This focus on the developmental or social role of universities coincides with the recent attention for social entrepreneurship that worldwide becomes increasingly popular (Bosma, Schøtt, Terjesen and Kew, 2016; Betts, Laud and Kretinin, 2018). For example, Sub-Saharan Africa has one of the highest proportion of social entrepreneurs in the world (Mirvis and Googins, 2018). One can argue that entrepreneurial universities in developing countries continue to be relevant as developmental universities by stimulating and supporting social entrepreneurship. They can do this for instance through experiential learning, partnering with civil society organisations, including 'social engagement' in curricula, or offering internships at social enterprises (Betts, Laud and Kretinin, 2018).

Of a different nature is the contribution of Salamzadeh, Salamzadeh and Reza Daraei (2011). Based on interviews with 25 higher education experts in Iran, they propose a framework of Input-Process-Output-Outcomes to understand the dynamics of an entrepreneurial university.

Last, both Etzkowitz and Clark touched upon entrepreneurial universities in a developing context. Etzkowitz (2003) is of the opinion that universities have an important role in furthering developing countries through adaptation of technologies for solving local problems or local innovations. Clark (2004) elaborated on the development of Makarere

University in Uganda as example of entrepreneurial university transformation in a highly problematic context. He explains that a change into becoming more entrepreneurial needs a supportive political and economic environment as well as a strong internal will to change.

Summarising, the body of literature on entrepreneurship development by universities in developing countries has started to emerge in the last decade, mainly focusing on entrepreneurship education. Scarce are articles analysing entrepreneurial characteristics of these universities beyond the education process.

Understanding the broader picture: the entrepreneurial ecosystem

Naudé, Szirmai and Goedhuys (2011) indicate that more than entrepreneurship, the determining factor for innovative behaviour in developing countries is a conducive policy and institutional environment. In a recent study on student entrepreneurship in Brazil, Alves, Fischer, Schaeffer and Queiroz (2019) come to a similar conclusion. They postulate that an unfriendly institutional environment is negatively affecting students' attitudes towards entrepreneurial intentions.

Thus, entrepreneurs, and universities alike, are part of a larger system that can be conducive or inhibitive for enterprising, which in recent literature is labelled as an 'entrepreneurial ecosystem' (Isenberg, 2010). It is relevant to introduce this broader system approach, because analysing differences among universities needs understanding of the context in which they operate (Foss and Gibson, 2015).

Literature unveils different views on how to define an entrepreneurial ecosystem. One view in which the system is 'surrounding' the entrepreneur, the other in which the entrepreneur is part and partial of it. Beugré (2017: 21) indicates an entrepreneurial ecosystem as the 'set of elements, individuals, organisations or institutions outside the individual entrepreneur' that influence the decision of an individual to become an entrepreneur and the level of success in the business undertaking. Acs, Szerb, and Lloyd (2017) stress the opposite, putting the entrepreneur literally at the heart of the system. They refer to a complex, multifaceted system driven by interacting individuals that are 'affected by institutions' (p19). The definition of Stam (2014: 5) is the most in tune with the definitions of entrepreneurship and entrepreneurial university used in this study. He defines an entrepreneurial ecosystem as 'an interdependent set of actors that is governed in such a way that it enables entrepreneurial action (output)', which leads to value creation in society (outcome). Enterprising is thus the result of the system, not the intrinsic part of it. Universities, as sources of knowledge, skilled workforce, networks and business opportunities can be influential actors within such an entrepreneurial ecosystem (Isenberg, 2010; Stam, 2014; ACEEU, 2016).

An entrepreneurial ecosystem is geographically bound, representing a set of interdependent actors (Beugré, 2017: 22). Beugré categorises systems on national, regional, local, and organisational level. A national system is composed of national policies and institutions in support of entrepreneurship. The regional ecosystem is the most known, benchmarked with Silicon Valley and substantiated in Porter's cluster theory of competitiveness (Porter, 2014). Locally, a city with its local regulations and business community could be labelled a system.

At organisational level, each organisation can be considered as an ecosystem. Universities for example can be conducive for entrepreneurial activities through an interplay of leadership, internal regulations, and entrepreneurship education. The entrepreneurial university concept of Gibb (2013) is based on such a systemic and holistic view. Although the main functioning of a system is geographically concentrated, Stam (2014) rightly stresses that entrepreneurial ecosystems should not be treated as 'localised contained' because 'national and global connections might be as important for the flourishing of entrepreneurship'.

When relating the above to the focus of this study on entrepreneurial universities, the question arises whether entrepreneurial universities tend to be more likely located within more entrepreneurial ecosystems. Although the obvious answer would be 'yes', this question can only be answered indirectly because there are no globally comparable data on entrepreneurial universities. However, data on entrepreneurial ecosystems on national level exist. The Global Entrepreneurship Index (GEI), published by the Global Entrepreneurship and Development Institute (the GEDI Institute), measures 14 categories of individual and institutional entrepreneurship related variables, resulting in a ranking on country level. The higher the score, the more entrepreneurial. The 2018 version ranked 137 countries (Ács, Szerb, and Lloyd, 2017). In addition, the Global Competitiveness Index (GCI) is an indicator of the economic performance of each country. Entrepreneurship contributes to and is reliant on this performance. GCI is composed of 12 pillars that are considered to be drivers of productivity and prosperity (Swab and Sala-i-Martín, 2017).

The only data available on a global scale in which universities are compared, are general ranking systems. One of these is the QS Graduate Employability Ranking (Quacquarelli Symonds) that for this purpose is used as a proxy for entrepreneurial universities. This ranking is chosen, because strengthening employability of graduates is a dominant imperative for universities in developing countries to become more entrepreneurial. The QS Graduate Employability Ranking contains indicators on employer reputation and on partnerships with employers. It provides information about how successful today's students are at securing a top job after graduation (QS Graduate Employability Rankings, 2018). In addition, the ranking of Reuters Top 100 universities is an illustration on where top universities are located.

In table 3, these data are clustered per type of country as characterised by the OECD (Least Developed Countries, Lower Middle-Income Countries, Upper Middle-Income Countries, and Higher Income Countries). The crystal clear picture arises that higher income countries score higher on the Global Entrepreneurship Index, are more competitive (have a better ranking on the Global Competitiveness Index), and house almost all of the universities that feature on the QS Graduate employability ranking. Even more, table 3 shows that no universities located in Least Developed Countries are appearing in the rankings. This analysis confirms that the environment in which universities in developing countries operate is less conducive for entrepreneurship development. It is important to be aware of this non-conducive institutional environment when researching entrepreneurial characteristics of universities in developing countries.

Table 3: Indications of entrepreneurial ecosystem and entrepreneurial universities clustered by OECD type of country

	No. of countries[1]	Mean GEI2018[2]	Mean GCI-ranking 2017-2018[3]	Number of universities in QS Graduate employability ranking 2018[4]	Number of universities in Reuters Top 100 ranking, 2017[5]
Least Developed Countries	30	0,15	112	0	0
Lower Middle Income Countries	29	0,22	90	23	0
Upper Middle Income Countries	36	0,27	70	78	3
Higher Income Countries	54	0,54	32	386	97

1. Source: OECD DAC list of ODA Recipients, http://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/daclist.htm. Accessed on: May 31, 2018. Only those countries are included of which GEI or GCI data were available.
2. Source: 2018 Global Entrepreneurship Index, https://thegedi.org. Accessed on: May 20, 2018. The mean of the overall GEI country scores is calculated per group of countries categorized by the OECD.
3. Source: World Economic Forum; Global Competitiveness Report 2017-2018; www.weforum.org/gcr, Accessed on April 12, 2018. The mean of the GCI country ranking is calculated per group of countries categorized by the OECD.
4. Source: QS Graduate employability ranking, https://www.topuniversities.com/university-rankings/employability-rankings/2018. Accessed on July 20, 2018.
5. Source: Reuters, https://www.reuters.com/article/us-amers-reuters-ranking-innovative-univ/reuters-top-100-the-worlds-most-innovative-universities-2017-idUSKCN1C209R. Accessed on July 20, 2018.

Concluding remarks

Literature reveals that there is a link between entrepreneurship education and entrepreneurship at one hand with its focus on individual development, and the entrepreneurial university at the other hand with its focus on institutional and organisational development. Furthermore, it is understood that successful entrepreneurship development is to be expected more in entrepreneurial universities, which operate in more entrepreneurial ecosystems. Whilst earlier research on entrepreneurial universities was mostly concentrated on their role in innovation and technology transfer, there is a more recent shift towards exploring universities' role in assisting students to accumulate entrepreneurial skills, because these skills are perceived to be essential in current society.

Against this background, universities are tasked to inspire their students with entrepreneurship education, stimulating young people to become job creators as well as more efficient job seekers. Universities are challenged to help overcome skill mismatches that are an important cause for un- or underemployment. The need for universities to adapt is the more important in many developing countries with their large young population and considerable population growth. Thus, how can universities become more relevant in a society in which entrepreneurship as occupational prospect is more important? In which way can universities contribute to the employability of their graduates? What can universities really do? Alternatively, more in general, how can a university contribute to socio-economic development?

There is a growing body of literature on entrepreneurial universities, also globally, although limited on higher education in factor-driven economies (low-income countries). However, in view of the widespread attention for entrepreneurship and entrepreneurship education in developing countries, more understanding of entrepreneurial universities in developing contexts is appropriate. Entrepreneurship development is seen as one of the instruments in pushing up the living standards in developing countries, and as such worthwhile pursuing and studying.

Entrepreneurial universities are context specific, hence lessons learnt in the USA or Europe may not automatically apply in countries like Ethiopia or Indonesia. This leads to the research gap of whether and how entrepreneurial transformation of universities in developing countries takes place, in particular viewed from the perspective of staff, students, and graduates. Given the specificity of each university, is it possible to identify common denominators? Answering such a question is complicated because the concept of entrepreneurial university is broad. This leads to a vague distinction between what could be labelled as entrepreneurial and what as non-entrepreneurial. Literature demonstrates that there is no single, one-size-fits-all, format for an entrepreneurial university and for the path

that may lead to becoming one. In an attempt to overcome this fundamental problem, this study will give specific attention to a few characteristics:

- Strategic intent: entrepreneurial are those universities that strategically are geared towards becoming entrepreneurial (Clark, 1998, 2004; Vorley and Nelles, 2009; European Commission and OECD, 2012; Gibb, 2012; Coyle *et al.*, 2013; ACEEU, 2016; Foss and Gibson, 2015). In the context of developing countries, does the university has a vision on how to contribute to socio-economic development and youth employment? Moreover, is this vision operationalised in a strategy? In other words, there needs to be an institutional will ('institutional volition') to change into a more entrepreneurial organisation (Clark, 2004).
- Leadership: a strategy alone is not enough to be entrepreneurial. It also needs to be owned and driven by the institutional leadership (Gjerding, 2006; Vorley and Nelles, 2009; European Commission and OECD, 2012; Coyle *et al.*, 2013; Gibb, 2013; Foss and Gibson, 2015; Leih and Teece, 2016). Does the university leadership 'walk the entrepreneurial talk' and encourages entrepreneurial behaviour of staff and students?
- Integrative approach: entrepreneurial are those universities in which entrepreneurial activities are interrelated with and create added value to education, research and community service (Gibb, 2013; Sam and Sijde, 2014; European Commission and OECD, 2014). Thus, this is different than considering and organising entrepreneurship activities as an add-on, separate to other existing university activities.
- Engagement with society: a prominent characteristic of an entrepreneurial university is engagement with society, creating public value through intensive working relations with a web of stakeholders, among which – but not solely – businesses (Etzkowitz, 2004; Clark, 2004; Gibb, 2013). Therefore, entrepreneurial are those institutions that have operational partnerships with businesses and government with the aim to strengthen economic and social development in their region and to contribute to youth employment.
- Support to student entrepreneurship: higher education institutions in countries with a large, young population are expected to stimulate entrepreneurship (Röpke, 1998; European Commission and OECD, 2014). This needs an identifiable, operational programme by which students are supported to become creative and innovative, and to start-up businesses (Fayolle, Gailly, and Lassas-Clerc, 2006; Gibb, 2013; European Commission and OECD, 2013; Fayolle and Redford, 2014; Maritz, Koch and Schmidt, 2016). Does such a programme exist and does it operate successfully?

Methodology

Research objectives and questions

The objective of this dissertation is to contribute to the understanding of entrepreneurial transformation of universities in developing countries. It is an explorative research into the factors explaining why some universities are more entrepreneurial than others. This study aims to investigate the entrepreneurial characteristics of universities in developing countries, to identify imperatives for and main challenges encountered in a possible entrepreneurial transformation process, and to unravel universities' contributions to the employability of their graduates. It is interesting to know the answers on these questions from different stakeholders of the university, in particular the university leadership, staff, students, alumni and business people. This leads to the major research question of this study:

How entrepreneurial are universities in developing countries?

The research questions derived from the overall research question are:

Research question 1: How can we measure the entrepreneurial intent and activities of universities in developing countries?

The holistic definition of entrepreneurial universities as used in this study requires a matching framework. Ideally, such a framework will allow for comparison regardless the different contexts – ecosystems – in which a university operates. Beyond the selection of a framework, this is also about identifying the most appropriate indicators and methodology.

Research question 2: Which factors influence how entrepreneurial a university is?

Transforming universities in a more entrepreneurial university is not happening overnight (Clark, 1998, 2004). In the USA and Europe, crucial triggers for change were reduced government funding and increased competition among universities. In addition, a strong institutional will to change seems to be making a difference. Little information is available from literature on possible factors that are specific to universities in developing countries in their entrepreneurial transformation.

Research question 3: What have been the implications of becoming a more entrepreneurial university on society?

The most difficult question to answer is on the results of entrepreneurial change at a university. This study seeks to relate information on university transformation with graduate start-ups and youth employment. It aims to present the views of different stakeholders of

the university, in particular the university leadership, staff, students, alumni and business people.

Design

The research method that most efficiently and effectively can answer the above formulated research questions is case study research. Case study research is the preferred method when the study is about explaining a social phenomenon (Yin, 2014), like in this case entrepreneurial university transformation. With the university as unit of analysis, this research used a multiple-case study design with university leadership, staff, students and graduates as main units of data collection. Universities in a few countries have been selected that in their diversity can shed light on entrepreneurial transformation in developing countries. Theoretical as well as pragmatic criteria were used for sampling the cases.

This study used non-probability, purposive sampling, heterogeneous with respect to country selection as well as type of universities (Saunders, Lewis, and Thornhill, 2012). In this manner, data collected enabled to document uniqueness of each case, building up a set of evidence on entrepreneurial characteristics, challenges and choices in developing countries.

The first sampling was on country level. It was the aim to reach maximal variation in the sense of geographical dispersion. Three characteristics have been used as sample selection criteria. First, the OECD classifies countries as Least Developed Countries, Lower Middle Income Countries, Upper Middle Income Countries and Territories, and Higher Income Countries (OECD, 2018). The focus of this research on developing countries justifies that the study limits to Least Developed Countries (48 countries) and Lower Middle Income Countries (35 countries).

Second, as Dutch researcher, working in the framework of development cooperation of the Netherlands, this large group of more than 80 countries is scaled-down to the 15 partner countries of Netherlands development cooperation (Government of The Netherlands, 2018). This limitation will also be beneficial for possible valorisation of this research, linking the results of this study with opportunities for the Netherlands, in particular for Maastricht University. Third, a final pragmatic choice was made based on accessibility for data collection within the period and budget of this study. The study was carried out on part-time basis with no travel budget allocated. Hence, symbiotic use has been made of travel options arising. This limitation resulted in the selection of three countries: Ethiopia, Indonesia, and the Palestinian Territories. Ethiopia is categorised by the OECD as Least Developed Country, whilst Indonesia and the Palestinian Territories are both Lower Middle-Income Countries (OECD, 2018). Table 4 indicates per country the stage of development according to Porter's classification and the World Economic Forum (Lopez-Claros, 2006).

Table 4: Stage of development of Ethiopia, Indonesia and the Palestinian Territories according to the World Economic Forum

	GDP per capita[1]	Stage of development[2]
Ethiopia	USD 2,000 (2016 est.)	Factor-driven economy
Indonesia	USD 12,400 (2017 est.)	Transition from Investment-driven to Innovation-driven economy
Palestinian Territories	USD 4,300 (2014 est.)	Transition from Factor-driven to Investment-driven economy

1. Source: CIA The World Factbook, 2018, accessed 20 October 2018
2. Based on The Global Competitiveness Report 2006-2007, p12, thresholds for establishing stages of development

Table 5 presents of each of these countries data on youth population, youth unemployment and Total early-stage Entrepreneurial Activity (TEA), with as reference the same data for the Netherlands.

Table 5: Youth population, youth unemployment and Total early-stage Entrepreneurial Activity (TEA) of Ethiopia, Indonesia and the Palestinian Territories, compared to data of The Netherlands

	% 0-14 years[1]	% 15-24 years[1]	Annual population growth[1]	Median age[1]	Youth unemployment rate[2]	TEA (year)[3]
Ethiopia	43,21%	20,18%	2,83%	17,9	25.2% 1)	14.73 (2012)
Indonesia	25,02%	16,99%	0,86%	30,2	15,80%	7.47 (2017)
Palestinian Territories	36.5%[4]	21.37%[4]	1.84%[4]	21.1[4]	46,80%	9.8% (2012)[5]
The Netherlands	16,41%	12,07%	0,39%	42,6	7,00%	9.92 (2017)

1. Source: CIA The World Factbook, 2018, accessed 20 October 2018
2. Source: ILO ILOSTAT, ILO modelled estimates, Nov. 2018. Accessed 11 March 2019: 2018 estimated youth unemployment rate (age 15-24)
3. Source: Global Entrepreneurship Monitor, accessed 20 October 2018
4. Only data of the West Bank
5. Source: Global Entrepreneurship Monitor, Palestine Country Report 2012

The second sampling was on university level. Four theoretical grounded criteria were used to select universities, besides the feasibility to access the university for data collection. The first criterion is the funding base of the university. Both private as well as public universities were selected because the funding base of the institution is considered as an important imperative for change (Clark, 1998, 2004; Gibb, 2013). In this respect, the main difference in the educational sector is public versus private funding.

The second criterion is the size of the university in terms of number of students, which is a factor of potential relevance mentioned by Clark (2004). The indicator used is a student population of more or less than 10,000 students. Third, the age of the university is used as criterion, differentiated between young universities of less than 15 years and those who are older, because transforming a university is a long process which can take ten years (Clark, 1998). And last, both comprehensive universities as well as universities with a specific

academic profile were selected. The academic profile of the higher education institution, being a comprehensive university or a technical university, could also explain differences between institutions. More entrepreneurial possibilities with industry linkages as well as funding opportunities are expected from science and technology (Clark, 1998).

Originally, it was the idea for this study to compare one university in country A with another university in country B. However, because literature clearly indicates that universities are to be understood in their specific context (Gjerding *et al.*, 2006), the research design evolved towards analysing more universities in the same country. The underlying assumption is that entrepreneurial transformation of universities operating in the same country is comparable, because the overall economic, social, cultural and political context is the same for all of them, all operating in the same national entrepreneurial ecosystem.

This resulted in the selection of 14 universities that are diverse with respect to the four above mentioned criteria: one in Indonesia, nine in Ethiopia, and four in Palestine (see table 6). In Indonesia only one university has been selected for testing the research framework and as an in-depth case: Bogor Agricultural University (IPB). This university is publicly funded, has more than 10,000 students, exists more than 15 years and has a specialised academic profile. Attempts have been made to collect data of a few more Indonesian universities through online surveying, but the response rate was far too low. In Ethiopia, nine universities were selected (out of a population of 37 universities). These universities are predominantly publicly funded, young, comprehensive universities. One private university is included as comparison. In Palestine, four universities were selected (out of a population of 14 higher education institutions on the West Bank). They are mixed in the sense of age, size, funding and academic profile.

Table 6: Multiple-case design: countries, number of universities and university characteristics covered in this research

	Indonesia (1 university)	**Ethiopia (9 universities)**	**Palestine (4 universities)**
OECD country classification 2018	Lower Middle Income Country	Least Developed Country	Lower Middle Income Country
Funding base: public or private	Public	Public (8) & Private (1)	Public (1) & Private (3)
Size: large or small (more/less than 10,000 students)	Large	Large (7) & small (2)	Large (2) & small (2)
Age: young or old (more/less than 15 years)	Old	Young (6) & old (3)	Young (1) & old (3)
Academic profile: comprehensive or specialised	Specialised	Comprehensive (8) & Specialised (1)	Comprehensive (3) & Specialised (1)

Source: author

Per university, a mixed method research was carried out comprising of qualitative and quantitative methods. Data were collected through various data sources, which allowed for triangulation. The main data sources were individuals from within and beyond the university: university leadership, teaching staff, students, university-graduated entrepreneurs and external stakeholders. Per university, interviews have been conducted, focus group discussions (FGD) organised, and surveys distributed. The main language used was English. The structured surveys were about perceptions of university leadership, teaching staff, and students about the entrepreneurial status of their university. It is realised that perceptions are a reflection of reality, but not the reality per se. This limitation has been countered through triangulation with information obtained from other sources. These sources are in-depth, semi-structured interviews with university leadership, management and external stakeholders, and FGDs with students and with teaching staff. Furthermore, desk research of university documents and websites helped to verify evidence obtained from the interviews, FGDs and surveys (Yin, 2014). Last, researcher's observation of the conditions on the university campus provided additional information, and hence served as another source of evidence. Overall, the emphasis was on collecting qualitative data through the interviews and group discussions, complimented by the quantitative results of the surveys. Table 7 summarises the number of people surveyed or interviewed in this research.

Table 7: Number of people surveyed or interviewed per country, categorised by leadership, teaching staff, students, graduate entrepreneurs, and external stakeholders

	Indonesia (1 university)	Ethiopia (9 universities)	Palestine (4 universities)	Total (14 universities)
University leadership				
Survey	1 (not used)	18	0	19
Interview	9	22	23	54
Teaching staff				
Survey	51	67	56	174
Interview	12	1	20	33
FGD	28	69	9	106
Students				
Survey	258	75	200	533
FGD	20	82	63	165
Graduate entrepreneurs				
Interview	7	7	0	14
External stakeholders				
Survey	0	43	0	43
Interview	8	7	10	25
FGD	0	42	0	42

Source: author

The number of respondents differ per countries. The in-depth research at the Indonesian university is reflected by a high number of respondents. This was made possible because of the working relation of the author with IPB since 2008. The supportive cooperation with the leadership of IPB offered many opportunities for data collection, including from a representative sample of all fourth year Bachelor students, and for testing the research methodology and instruments. Both the field studies in Ethiopia as well as in Palestine had to be carried out in a shorter time frame. Data collection, in particular surveying, was partly dependent on good will of university staff and the work of data collectors. In Ethiopia, the most effective way for collecting data in a restrictive time appeared to be the Focus Group Discussion. In Palestine, it was unfortunately not possible to collect data from graduate entrepreneurs.

Operationalisation

There is no agreement on how to operationalise entrepreneurial university, and which activities lead to which situation is not well defined. Concepts of entrepreneurial university differ, hence frameworks and indicators for assessing them as well (Clark 1998, 2004; Etzkowitz, 2004; Kirby, 2006; Rothaermel, Agung and Jiang, 2007; Guerrero and Urbano, 2012; European Commission and OECD, 2012, 2013; Coyle *et al.*, 2013; ACEEU, 2016; Etzkowitz *et al.*, 2017).

For this study, 'HEInnovate' is found to be the most appropriate framework for answering the research questions. HEInnovate is an online self-assessment tool developed for European universities by the European Commission's Directorate General for Education and Culture together with the OECD Local Economic and Employment Development Programme (LEED) (European Commission and OECD, 2013). In this research, the 2015 updated version is used that comprised of seven categories with in total 37 statements about the entrepreneurial status of a university. The categories are the following:

- Leadership and Governance: this category groups aspects such as the institutional mission, vision, and strategy, the role of top-management, institutional-wide coordination, the degree to which innovative activities are stimulated, and the strategic role the institution plays in local development.
- Organisational capacity: funding, people and incentives: Under this heading resources, in terms of money and people, are grouped. They are needed to fulfil the entrepreneurial mission and strategy. An important aspect is the degree to which entrepreneurial behaviour of staff is incentivised.
- Entrepreneurial Teaching and Learning: this category is a cluster of variables dealing with the entrepreneurial mindset. Is this stimulated in education, both through content as well as approach?

- Preparing and Supporting Entrepreneurs: this category deals with the programmes and facilities the institution has in place for supporting those students, staff and alumni that want to start-up a business, including giving access to finance, networks, and incubation.
- Knowledge Exchange and Collaboration: this category concerns how the institution organises and stimulates knowledge creation with and for the benefit of the social, cultural and economic development of society.
- The internationalised institution: internationalisation is important for an entrepreneurial institution seeking innovation. This category focuses on staff and student mobility and the importance of international research and partnerships.
- Measuring the impact: what does the institution do to measure the results of its entrepreneurial strategy and activities?

In 2018, beyond the data collection period of this study, an eighth category was added to HEInnovate named 'Digital Transformation and Capability'. This category groups statements related to the ability of a university to integrate, optimise and transform digital technologies to support innovation and entrepreneurship.

In this study, the applicability of the framework is tested at universities in developing countries, thus beyond the group of high-income European countries. The choice for HEInnovate is justified because of several reasons. No alternative framework was available that focused on universities located outside OECD countries or that had a global approach. Furthermore, HEInnovate is the operationalisation of Gibbs definition of an entrepreneurial university (2013) as used in this research, it is comprehensive, it was the most recent framework available at the time of the start of this study, and it is the result of a cumulative knowledge body and strongly promoted through a set of workshops for university leaders. Of importance is as well that the framework was already validated: it was applied and operationalised in assessments of several (European) universities. In addition, the five characteristics as chosen to be of importance for this research (strategic intent, leadership, integrative approach, engagement with society, and support to student entrepreneurship) are part of this framework as well.

In the research chapters of this dissertation, HEInnovate is applied in comparable but different ways (see table 8). In the first research chapter, the framework is tested at one university in Indonesia (IPB). At the start of working on this case study, the research framework was developed in detail. All HEInnovate statements have been elaborated for this research in a framework with variables and a set of indicators per variable (see appendix one). In addition, decisions have been taken on how to measure each indicator, the data collection method per indicator, and the adequate survey or interview question(s) or source(s). This was the basis for composing the data collection instruments, which were 1) a survey for leadership and staff with statements about their university; 2) a similar survey for

students; 3) interview protocols composed of the main topics to be addressed; and 4) a list of university documents to be collected (see appendix two, three, four and five).

Next, comparative analyses have been made in Ethiopia and in Palestine by applying the HEInnovate framework. In Ethiopia, the framework allowed for collecting and analysing data from nine different universities by a small team of researchers. In the study among the Palestinian universities, the specific question was whether HEInnovate would also be appropriate in the complex context of that country, in which university operations are constrained by the occupation. In chapter five, about university-graduated entrepreneurs, an attempt is made to combine HEInnovate with individual entrepreneurial characteristics of these entrepreneurs. Last, at the end of this dissertation, conclusions are drawn on the advantages and limitations of using HEInnovate.

Table 8: The application of HEInnovate in the chapters of this dissertation

Chapters of this dissertation	Application of HEInnovate
Chapter 2: Indonesia	In-depth testing of the HEInnovate framework at one university
Chapter 3: Ethiopia	Comparison of nine universities by using the HEInnovate framework
Chapter 4: Palestinian Territories	Comparison of four universities by using the HEInnovate framework, taking into account the specific complex context in which these universities operate
Chapter 5: University-graduated entrepreneurs	Linking the HEInnovate framework with individual entrepreneurial characteristics
Chapter 6: Findings, reflections and contributions	Conclusions on the relevance and limitations of the HEInnovate framework

Source: author

The above explained analytical framework and operationalisation of assessing entrepreneurial universities, in combination with the dynamic model of Input-Process-Output-Outcomes (Salamzadeh *et al.*, 2011; Etzkowitz *et al.*, 2017), resulted in the conceptual framework of this dissertation as pictured in figure one. Indicated in the model is also which research question is related to which part of the model.

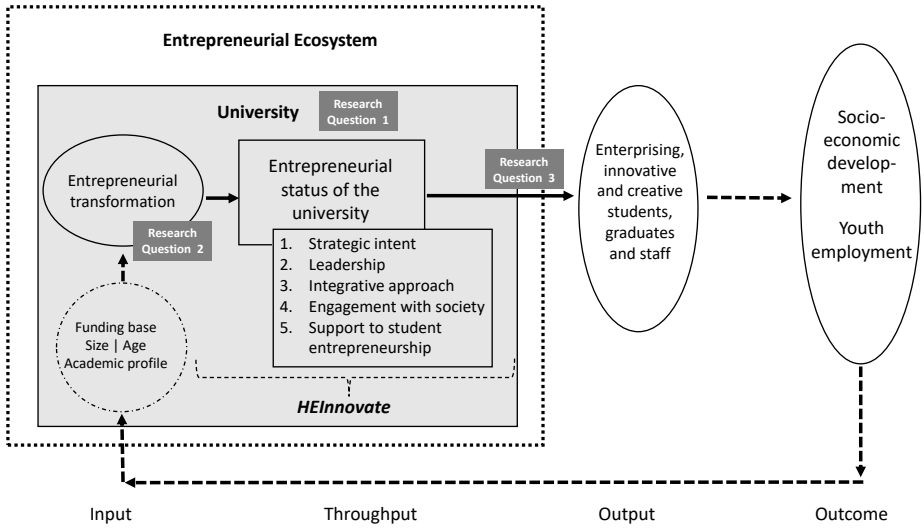

Figure 1: Conceptual framework of this dissertation.

Validity, reliability and limitations

The research design chosen ensures a maximum validity. Above all, the multiple sources of evidence increased the validity (Yin, 2014), enabling triangulation with solid, well founded results. Furthermore, all draft reports of the universities assessed were reviewed by key informants. In addition, interviews with graduate entrepreneurs were reviewed by the interviewees. Last, the validity of the surveys was tested successfully using factor analysis before dissemination.

By documenting the procedures followed and resources used, a conscious attempt is made to maximise the reliability of this study. Comparable answers on the research questions may be expected if and when this research would be replicated.

It is however unlikely that a similar research undertaken at the same universities would generate exactly the same findings about the entrepreneurial status of these universities. Most importantly is that results of this study have been presented at the universities assessed and as such have become a factor in the entrepreneurial transformation process of these institutions. A university leader in Ethiopia explicitly had stated that the study had opened his eyes, whilst the assessment in Indonesia covered a period of more than two years during which many conversations took place with internal change agents and leadership. Furthermore, the context in which the universities operate have changed. Relevant to note are the political unrests in Ethiopia (in 2017 and 2018) that by times had direct negative implications on university operations. Or the plans in 2018 in Palestine to open more universities, which would affect the competition among the universities. Last, the

population of informants (unit of data collection) has changed. People left the universities, in particular students, but as well university leaders and teaching staff. For instance at the Indonesian university studied, the full leadership renewed when the terms of office of the previous leadership ended, and in Ethiopia the turnover of staff is high. Concluding, the results of the university assessments should be seen within the period of the data collection.

Another limitation is within the country selection. With three countries chosen, it is unwise to generalise firmly the findings of this study to the level of all developing countries.

Introducing the chapters

The core of this dissertation consists of four research chapters that each in its own way sheds light on the challenges and opportunities of entrepreneurial transformation of universities in a developing context. These chapters are succeeded by a concluding chapter in which the overarching findings and contributions are presented as well as answers to the three research questions. Which research questions are addressed in which research chapters is depicted in table 9.

Table 9: Overview of which research questions are addressed in which research chapters

	Chapter 2: Indonesia	Chapter 3: Ethiopia	Chapter 4: Palestinian Territories	Chapter 5: University-graduated entrepreneurs
RQ1	X	X	X	-
RQ2	X	X	X	-
RQ3	X	-	+/-	X

Source: author

Entrepreneurial university transformation in Indonesia: a comprehensive assessment of IPB[2]

In the first chapter, the case is presented of Bogor Agricultural University (IPB), the national agricultural university of Indonesia. Founded in 1963, IPB is one of the leading Indonesian public universities of the country. In 2016, IPB entered the Top 100 of QS World University Ranking by subject on Agriculture and Forestry, and it ranks number 130 on the QS Asian University Ranking (QS Quacquarelli Symonds, 2018b). Although public institutions only comprise of 8.5 per cent of all 4,378 higher education institutions in Indonesia, focusing on public universities is relevant. This is because they are the leading universities in the country, of which some – like IPB – appear on international university rankings (Fauzi, 2018).

[2] Mudde, H, Primaswari, A. and Fauzi, A.M. (2017). Entrepreneurial university transformation in Indonesia: a comprehensive assessment of IPB. GSTF Journal on Business Review (GBR), Vol. 5, No. 1, pp. 46-61.

Beyond the detailed case description as presented in the article, an attempt is made to identify metrics for comparing the entrepreneurial status of IPB with other public universities in Indonesia. Indicators tested are I) the total number of student start-ups scaled to the total number of students. This indicator relates to IPB's work on creating entrepreneurial graduates. II) Income from university spin-offs, business development services, and joint ventures as percentage of the annual university budget. This indicator relates to university business development. III) Income from externally funded research as percentage of the total research budget. This third indicator relates to interest of and involvement of government and private sector in knowledge generated by the university.

Entrepreneurial Change in Government-led Development: Ethiopian Universities[3]

The second chapter is based on an assessment of eight public universities and one private university across Ethiopia, using the same methodology and instruments as tested in Indonesia. This multi-case study was about exploring the entrepreneurial status of Ethiopian public universities and possible differences among these universities.

The choice for Ethiopia is relevant academically as well as for pragmatic reasons. Academically, because although Ethiopia is the second most populous country in Africa with more than 100 million people (CIA, 2018), there is a dearth of literature about and from the higher education sector in that country. Of particular interest is the fact that with exception of two universities, all public universities in Ethiopia have been founded during the last 25 years through a government policy that was aimed at increasing access to higher education (FDRE, 2015). Furthermore, the selection of Ethiopian higher education in this research is relevant because of the expectations towards universities to strengthen entrepreneurial skills of graduates. Entrepreneurship education is seen as a remedy against youth unemployment in a context in which 63.4 per cent of the population is below 25 years of age (CIA, 2018).

Complementing the case study on IPB, this chapter highlights four theoretically grounded factors of importance for entrepreneurial transformation of universities. This are leadership, funding, engagement with society, and discretion, or – differently stated – the extent to which the university leadership, staff and students can act autonomously.

[3] Mudde, H.L.M., Van Dijk, M.P., Gerba, Dugassa Tessema and Alemfrie, Derese Chekole (2019). Entrepreneurial Change in Government-led Development: Ethiopian Universities. Higher Education, Skills and Work-Based Learning. Emerald, https://doi.org/10.1108/HESWBL-07-2018-0073

Universities in the complex setting of the West Bank: entrepreneurial or engaged?[4]

The third chapter, on universities in the Palestinian Territories, is - more than the other two articles - zooming-in on the interrelation of the universities with the context in which they operate, in this case the atypical context of the Israeli occupation. The case study problematises the concept of entrepreneurial university in this specific context and introduces the alternative concept of engaged university.

The chapter is based on an assessment of four universities in the West Bank following the same approach as in the research in Indonesia and Ethiopia. Unfortunately, no university located in Gaza Strip could be included in the research, because of the impossibility to access the area.

Similar to Indonesia and Ethiopia, there is much attention for entrepreneurship development in Palestine. Palestine faces extreme high youth unemployment of above 40 per cent (ILO, 2018) in a situation that almost 60 per cent of the population is below 25 years of age (CIA, 2018). It is in this context that also Palestinian universities undertake activities towards strengthening entrepreneurial skills of graduates and increasing business opportunities.

Entrepreneurial Universities and Nascent Entrepreneurs

After the three case studies that all have an organisational perspective, the fourth study offers another angle to studying the concept of entrepreneurial universities. It starts from the widespread idea that universities try to graduate students with entrepreneurial skills and - behaviour, and that entrepreneurial universities might be more successful in this endeavour than other universities (Fayolle and Redford, 2014; Röpke, 1998).

Differently than the other chapters, this study takes an individual entrepreneur as unit of analysis, in particular nascent entrepreneurs. This are persons who are actively setting-up a new business (Global Entrepreneurship Research Association, 2018). Through interviews with 14 purposefully selected entrepreneurs graduated from a university in Ethiopia or Indonesia, this study investigates to what extent entrepreneurial behaviour of graduates can be attributed to characteristics of entrepreneurial universities. It assumes that the stronger this attribution, the more successful the entrepreneurial university transformation. The stories of all 14 entrepreneurs are presented in appendix six.

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[4] Mudde, H.L.M. (2020). Universities in the complex setting of the West Bank: entrepreneurial or engaged? In: Weimer, L. and Nokkala, T. (Eds). *Universities as political institutions - HEIs in the middle of academic, economic, and social pressures.* Leiden: Brill | Sense.

In this chapter, the attribution to characteristics of entrepreneurial universities is compared with attribution to three human capital characteristics, i.e. social network (including entrepreneurial parents), work experience, and training. These characteristics are grounded in human capital theory that explains that individuals with more knowledge, better skills, and more competencies perform better than others (Martin, McNally and Kay, 2013). The underlying notion, which in this chapter is theoretically underpinned, is that entrepreneurship can be learnt. This notion is valid for the dissertation as a whole.

Chapter 2

Entrepreneurial university transformation in Indonesia: a comprehensive assessment of IPB[5]

Mudde, Huub L.M., Widhiani, Anita P., Fauzi, Anas M.

[5] *Mudde, H, Primaswari, A. and Fauzi, A.M. (2017). Entrepreneurial university transformation in Indonesia: a comprehensive assessment of IPB. GSTF Journal on Business Review (GBR), Vol. 5, No. 1, pp. 46-61.*

Abstract

This chapter[6] explores university entrepreneurial transformation in Indonesia with a case of Bogor Agricultural University (IPB). Data and information were collected through a content analysis of university policy and educational documents, a structured survey with 331 respondents, in particular staff and students, and 21 in-depth interviews and five focus group discussions with 77 people comprising university top-management, faculty, students, and external stakeholders. The European Commission/OECD entrepreneurial university framework was applied for the data analysis. In addition, quantitative indicators were compared with 76 Indonesian and 15 Asian universities. Findings indicate that IPB is an entrepreneurial university from the perspective of research-based technology transfer and innovation. In addition, qualitative information indicates that the entrepreneurial development of the learning and teaching processes needs more attention, however when quantitatively assessed, the student entrepreneurship output is high in relation to many other universities. The results have relevance for the higher education community in terms of understanding the complexity of transforming knowledge institutions into more entrepreneurial organisations. The authors demonstrate a holistic assessment methodology and subsequently propose objective measurements for assessing the entrepreneurial status of a university.

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[6] This chapter is an extended version of the paper presented at the 6th Annual International Conference on Innovation and Entrepreneurship (IE 2016): Mudde, H, A. Primaswari, and A.M. Fauzi, Entrepreneurial transformation and university leadership in Indonesia, Singapore: GSTF, 2016.

Introduction

Indonesia is the largest economy in Southeast Asia with a Gross Domestic Product (GDP) of around 2.8 trillion USD, in size number nine globally, and with an annual growth rate of around five per cent (CIA, 2016). Micro, small and medium enterprises (MSMEs) are the backbone of the Indonesian economy. They account for around 99 per cent of all firms in all economic sectors and 57 per cent of the Indonesian GDP in 2012, and employ over 95 per cent of the population (Bellefleur, Murad and Tangkau, 2014). According to the Global Entrepreneurship Development Index (2016), Indonesia ranks 103 in the world and 18 in the Asia Pacific region (GEDI, 2016). Many programs are set-up by government, universities, and private sector to stimulate entrepreneurship development as an instrument for employability and poverty alleviation: an estimated 11.3 per cent of the population is living below poverty line (CIA, 2016).

Universities play an important role in economic development as provider for highly knowledgeable and skilled young entrepreneurs as well as for new know-how and technologies. They are offering entrepreneurship education as a way to develop the entrepreneurial mindset of graduates, encouraging university students to become self-employed, and are setting-up technology transfer mechanisms. Also in Indonesia, many universities have promoted entrepreneurship development and set-up entrepreneurship education programmes (Abduh, Maritz and Ruthworth, 2012). However, this requires an entrepreneurial university (Röpke, 1998; Etzkowitz, 2004; Kirby, 2006; IPB, 2012; Fayolle and Redford, 2014). This chapter therefore explores the entrepreneurial transformation process of universities in Indonesia.

A study has been carried out in 2015 and 2016 to assess the entrepreneurial characteristics and entrepreneurship development activities of Bogor Agricultural University/Institut Pertanian Bogor (IPB), applying the assessment framework for European entrepreneurial higher education institutions named HEInnovate (European Commission and OECD, 2013). Subsequently, IPB has been compared with other universities using a few quantitative indicators. In this study, Gibb's definition of entrepreneurial universities has been used (Gibb, 2013), which refers to an academic organisation that is conducive for staff and students to demonstrate enterprise, innovation and creativity, that creates public value, partners with local, regional, national and international stakeholders, and is able to effectively operate in a dynamic context.

The case of IPB is chosen, because it is one of the leading national public universities of the country, taking up a position of dominance in education, research and community outreach. Founded in 1963, the university with its 24,000 students is operating center-stage in the framework of the private sector led and agricultural sector driven economic

development policies. In 2016, IPB entered the Top 100 of QS World University Ranking by subject on Agriculture and Forestry. Nationally, IPB received in 2012 the award of being the university with the highest number of registerred patents, in 2015 for the highest number of commercialised patents, and in 2016 for the most productive IP office.

This chapter first reviews literature on entrepreneurial universities, entrepreneurship education and university comparison and describes the research methodology used. Next, it presents the main findings and concludes with a discussion and conclusions.

Literature review

In 1998, Clark introduced the entrepreneurial university concept explaining how higher education institutions deal with growing number of students vis-à-vis limited resources, the demand for contributing to economic growth with innovation and knowledge generation, the information and communication technology revolution, and globalisation (Clark, 1998; Clark, 2004; Gibb, Haskins and Robertson, 2009, updated 2012; Gibb, 2013; European Commission and OECD, 2013; Coyle, Gibb and Haskins, 2013). Central to Clark's non-economic interpretation is the transformation of government-sponsored universities to a more independent status (Etzkowitz, 2016). The entrepreneurial university is perceived to be able to cope with societal challenges by innovation in research, knowledge exchange, teaching and learning, governance and external relations (European Commission and OECD, 2012).

Another, more economic approach that has become dominant in the discourse on entrepreneurial universities, is advocated by, among others, Etzkowitz (Etzkowitz, Webster, Gebhardt and Cantisano Terra, 2000; Etzkowitz, 2004), in which the focus is on the role of universities in innovation and regional economic development through translating research into commercial outcomes. Traditionally, innovation is derived from academic knowledge, whilst this is nowadays complemented by a contrary process in which problems in society are researched in search for scientific solutions. Etzkowitz illustrates this with the example of an university incubator, in which some start-ups are the spin-off of academic research, whilst others are small firms that seek the proximity of the university with its access to academic knowledge. He positions universities in a so-called Triple Helix innovation system in which academia, businesses and government cooperate. In this knowledge infrastructure, entrepreneurial universities are institutions that transform themselves into entrepreneurial enterprises of innovation, knowledge transfer, and technology commercialisation (Gibb, 2013; Payumo, Arasu, Fauzi and Siregar, 2013). In addition, the Indonesian Ministry of Research, Technology and Higher Education stresses the importance of Triple Helix cooperation in its strategy for preparing new entrepreneurs in agriculture and technology (Ministry of Research, Technology and Higher Education, 2015).

Entrepreneurial university frameworks

The literature reveals different frameworks for understanding the entrepreneurial university (Clark, 1998; Clark, 2004; Etzkowitz, 2004; Kirby, 2006; Rothaermel, Agung and Jiang, 2007; Guerrero and Urbano, 2012). For instance, Kirby (2006) focuses on entrepreneurial behaviour, cultural entrepreneurial aspects of the institute and individual mindset and skills.

In 2013, the OECD Local Economic and Employment Development Programme (LEED) together with the European Commission's Directorate General for Education and Culture launched an online self-assessment tool for European entrepreneurial higher education institutions named HEInnovate (European Commission and OECD, 2013). HEInnovate is not seen by the authors as a benchmarking tool. It is seen to help self-assessment of an entrepreneurial development by the universities themselves for internal use and for comparisons over time against previous assessments. Although elements of Etzkowitz' innovation-focused model are included, in particular the importance of multi-stakeholder knowledge exchange and partnerships, the European Commission/OECD framework is comprehensive, inspired by Clark's broad entrepreneurial university concept of institutional transformation and Gibb's definition. It is operationalised in seven categories of statements that are considered to be characteristic for an entrepreneurial university: 1) Leadership and Governance; 2) Organisational capacity; 3) Entrepreneurial Teaching and Learning; 4) Preparing and Supporting Entrepreneurs; 5) Knowledge Exchange and Collaboration; 6) Internationalisation; and 7) Measuring impact.

Also in 2013, the National Centre for Entrepreneurship in Education in Coventry, United Kingdom (NCEE) published the University Entrepreneurial Scorecard (Coyle *et al.*, 2013). Just as HEInnovate, this scorecard is operationalised in qualitative statements (around 100) but divided over six categories that are meant to explore the entrepreneurial capacity of a university. These categories are: I) Concept, vision, mission and strategy; II) Governance; III) Organisational design; IV) Public value and Stakeholder engagement; V) Knowledge exchange and Incubation; and VI) Internationalisation.

The most recent framework is introduced in 2016 by the Accreditation Council for Entrepreneurial and Engaged Universities (ACEEU). This is a new body set-up by the University-Industry International Network (UIIN) meant to provide institutional accreditation with a focus on entrepreneurship and engagement. ACEEU is structuring entrepreneurial universities along five dimensions: 1) Orientation and strategy (institutional commitment, shared goals, financial planning); 2) People and organisational capacity (leadership, staff profile, incentives and rewards); 3) Drivers and enablers (culture, internal support structures, service alignment); 4) Education, research and third stream activities (education, research, third mission activities); 5) Innovation and impact (continuous improvement, influence within the ecosystem, impact). In its definition of entrepreneurial university, ACEEU puts

emphasis on the economic impact of societal contributions, entrepreneurship development in education, commercialisation of research, and entrepreneurship as priority in third mission activities (ACEEU, 2016).

Box 1. The seven categories of the European Commission/OECD self-assessment framework for entrepreneurial universities

1. Leadership and governance: this category groups aspects such as the institutional mission, vision, and strategy, the role of top-management, institutional-wide coordination, the degree to which innovative activities are stimulated and the strategic role the institution plays in local development.
2. Organisational capacity: funding, people and incentives: under this heading resources, in terms of money and people, are grouped. They are needed to fulfil the entrepreneurial mission and strategy. An important aspect is the degree to which entrepreneurial behaviour of staff is incentivised.
3. Entrepreneurial teaching and learning: this category is a cluster of variables dealing with the entrepreneurial mindset. Is this stimulated in education, both through content as well as approach?
4. Preparing and Supporting Entrepreneurs: this category deals with the programmes and facilities the institution has in place for supporting those students, staff and alumni that want to start-up a business, including giving access to finance, networks and incubation.
5. Knowledge Exchange and Collaboration: this category concerns how the institution organises and stimulates knowledge creation with and for the benefit of the social, cultural and economic development of society.
6. The internationalised institution: internationalisation is important for an entrepreneurial institution seeking innovation. This category focusses on staff and student mobility and the importance of international research and partnerships.
7. Measuring the impact: what does the institution do to measure the results of its entrepreneurial strategy and activities?

Source: Adapted from www.heinnovate.eu, accessed in 2013, 2014, 2015

It is understandable that a university cannot become entrepreneurial in one day. Clark (1998, 2004) stressed that it is an organisational change process of ten to 15 years. In a study at 20 universities, Gjerding *et al.* (2006) concluded that a successful process requires a top-down leadership drive that welcomes bottom-up initiatives, 'stimulating a culture of intrapreneurship' (Gjerding, Wilderom, Cameron, Taylor and Scheunert, 2006). Nelles and Vorley (2010) referred to an entrepreneurial transformation process with five elements. They state that building an entrepreneurial architecture needs the development of organisational structures, communication and coordination systems that help in effectively

relate the different initiatives, leadership – including vision - , strategies, and attention for the organisational culture, which is the most difficult to change (Nelles and Vorley, 2010).

University comparison

There are many cases described in literature of less or more entrepreneurial universities, but comparing different universities on their entrepreneurial status is difficult, in particular across countries. There are two main reasons for this. First, the way a university is embedded in and interacts with its context is fundamental for the entrepreneurial university concept. In other words, the extent to which a university is entrepreneurial is to be understood within a specific context (Gjerding *et al.*, 2006). A study of ten universities in the USA and Europe (Foss and Gibson, 2015) came to the conclusion that clustering of universities around size and age is not useful for describing entrepreneurial differences. What matters however is the regional and national context.

The literature reveals only one case in Indonesia other than IPB. In 2009, Damayanti and Zuhairi described the gradual entrepreneurial transformation process of Universitas Terbuka, Indonesian's Open University (Damayanti and Zuhairi, 2009). They mention the importance of networking and partnerships, creation of revenue generating programmes, and systematic planning and open management. The most important trigger for change was the limited government funding which asked for a more entrepreneurial approach.

Second is of a methodological nature. Characteristic for the available frameworks is that they use perception-based instruments for exploring the entrepreneurial status of universities. HEInnovate and NCEE use Likert scales; ACEEU is listing issues to be addressed. This is not conducive for comparison among universities, because perceptions are context specific and subjective. Even more, an internationally agreed set of indicators measuring entrepreneurial universities does not exist, although attempts have been made. In 2003, a literature review of seven surveys on academic entrepreneurship in combination with a Delphi survey resulted in a long-list of input and output indicators on business creation inside higher education institutions, including weighted indicators (by academic staff and research expenditures) in order to allow benchmarking (Gómez-Gras Jesús, Pastor-Ciurana, Galiana-Lapera, Mira-Solves Antonio and Verdú-Jover, 2003). The input indicators were categorized by **I)** policies and strategies; **II)** stock of technology; **III)** resources and initiatives and **IV)** human capital. The output categories were **I)** start-up activity; **II)** internal and external impacts, and **III)** wealth creation. This set of indicators does not cover the broadness of entrepreneurial university as used in this study and in recent literature, and the large number of indicators may cause operational issues of data availability and costs.

In search of a measurement model for identifying a university's entrepreneurial orientation, Tijssen (2006) tested two indicators for university-industry linkages (one of the seven

categories of the European Commission/OECD framework), i.e. public–private co-authored research articles, and citations within corporate research articles to university research articles. The findings indicated that other, context specific factors are more relevant for understanding the university-industry relations, in particular the country of location and the 'magnitude of research activities in industrially relevant fields of science' (Tijssen, 2006).

In 2008, the NIRAS survey on Entrepreneurship in Higher Education in Europe (NIRAS, 2008) used a broader framework focusing on student entrepreneurship as well as commercialisation of research. Besides qualitative information, it developed a small set of quantitative indicators: Share of students enrolled for entrepreneurship courses as percentage of total amount of students; Number of executive education attendants; Number of students participating in extra-curricular activities; Number of patents; and percentage external funding. Although only partially covering the entrepreneurial university concept, virtue of this model is in its simplicity.

As a response to the lack of a uniform measurement system, an international working group launched in 2015 the Global Entrepreneurial University Metrics initiative (GEUM) to design appropriate metrics 'across all three missions of education, research and innovation/ entrepreneurship' (Etzkowitz, 2016). It is the intention that their findings will ultimately be used for modifying university ranking systems.

Entrepreneurship education in Indonesia

It should be noted that besides the limited research on entrepreneurial universities in Indonesia, literature is available around the narrower concept of 'entrepreneurship education'. This is just one of the many aspects of the broader concept of entrepreneurial university. Entrepreneurship development gets a lot of attention in Indonesia. In 2015, entrepreneurs accounted for 1.56 per cent of the total population (Al Hadi, 2015). This is below the minimum of two per cent as desired by the Indonesian government and compared to neighbouring countries: in Singapore it is seven per cent, Malaysia five per cent, Thailand 4.5 per cent, and Vietnam 3.3 per cent (Himawan, 2016).

In order to increase this low percentage, universities in Indonesia including IPB are offering entrepreneurship education programmes to students and are encouraging them to become job creators instead of job seekers. The purpose of the provision of the entrepreneurship education includes introducing students to entrepreneurship and motivating students and graduates to be self-employed and thus creating job opportunities. (Sembiring, Sandjaja and Antonio, 2011).

Several examples are described in literature, from Telkom University in Bandung – offering mandatory and elective courses – and from Ciputra University in Surabaya with its

interdisciplinary, team-based business – and social enterprising projects (Ghina, Simatupang and Gustomo, 2014; Antonio, Lanawati, Wiriana, and Christina 2014). Abduh *et al.* (2012) is focusing on how Bengkulu University is fostering entrepreneurial intentions of students. A critical evaluation of the impact of entrepreneurship education is made by the Technical University ITB in Bandung, expressing a growing concern that entrepreneurship education does not make students become entrepreneurs. Their findings have been compared with data from students and graduates of the Maranatha Christian University in Bandung: those who became entrepreneur are Chinese Indonesians from business families. These graduates indicated that they have learnt to be entrepreneurial mainly from their relatives instead of from the university (Lubis, 2015). Last, a study on entrepreneurship education at 18 Indonesian vocational high schools assessed the entrepreneurial characteristics of students as being low and subsequently recommends to capacitate teachers, improve networking, and strengthen the entrepreneurial orientation of school management (Winanro, 2016).

Concluding, literature on entrepreneurial universities in Indonesia is almost absent, and the available literature is focusing on entrepreneurship education. Globally, the majority of the literature on entrepreneurial universities is focusing on research-based knowledge transfer and commercialisation. Literature gives less insight on how entrepreneurial universities are when using the broader, non-economic perspective advocated by Clark and measured with the European Commission/OECD framework. Last, no universal, objective system exists for comparing entrepreneurial universities. Thus, is it possible to identify university comparable indicators for an entrepreneurial university? What lessons can be drawn from Bogor Agricultural University, one of the prominent academic universities in Indonesia?

Methodology

The analytical framework of this study is based on the European Commission/OECD self-assessment tool with its seven categories. The framework has been operationalised by identifying per category a set of variables and per variable indicators, resulting in 37 variables and 125 indicators. Data were collected between December 2015 and May 2016 from four categories of respondents - university leadership, faculty, students, and external stakeholders - using mixed methods: structured questionnaires (see appendix two and three), a content analysis of university policy and educational documents (see appendix four), and in-depths interviews and focus group discussions (FGD). The sampling plan was made in order to get multi-perspective data about IPB: from those that are leading in the development of the institute, from employees, from the main client group (students) as well as from external relations.

The questionnaire for teaching staff was distributed to all 35 departments of the nine university faculties. From each department, the target was to get responses from the head of

the department and three faculty members with different work experiences at IPB: up to ten years, between 11-20 years and more than 20 years. The research among the students used probability, stratified random sampling to allow for statistically significant conclusions on population level. A sampling frame has been used with the name of all the seventh semester students and per student the Major indicated. The number of students in the sample per Major was a direct proportion of the number of students of each Major. The students were selected by using the 'random calculator'. The reason why only seventh semester regular Bachelor students were included was twofold. First, it was important to focus on students that already had several years of experience with IPB, thus able to give evidence-based responses. Secondly, it was argued that the student population should be as homogeneous as possible with respect to number of years at IPB and educational background.

The sampling for the interviews and focus group discussions was based on purposeful sampling. It comprised of all hierarchical management layers of IPB, staff with specific business and innovation oriented mandates, entrepreneurship education lecturers, young staff and female staff, the broadness of the university faculty structure, business representatives, students with no specific entrepreneurship interest, and students active in IPB's student-led Center of Entrepreneurship Development for Youth. See table 1 for the population and sample size and composition.

Table 1: Population and sample size and composition

	Leadership	Teaching staff	Students	Externals
Research population size	25	1.092	3.640	Not known
Number of surveys distributed	20	145	708	1.289
Survey results	1 (5%), not included	51 (35.2%)	258 (36.4%)	17 (1.3%), not included
Interviews	9	12	0	8
FGD (number of participants)	0	3 (28)	2 (20)	0

Source: authors

The questionnaires for students and staff have been tested for validity and reliability using factor analysis. Since the questionnaires have been based on the seven categories of the European Commission/OECD framework, each category has its own validity score[7]. All scores - Cronbach's Alpha – are 0.7 or far above, indicating that the factors are reliably measured by the relevant questions in the questionnaire.

7

Factors	Cronbach α
1. Leadership and Governance	0.936
2. Organisational capacity	0.955
3. Teaching and Learning	0.956
4. Supporting entrepreneurs	0.964

Factors	Cronbach α
5. Collaboration	0.932
6. Internationalisation	0.897
7. Impact measurement	0.771

The questionnaire for the external stakeholders has not been tested because at least 30 responses were needed for testing. It was distributed through email by using a distribution list received from IPB's centre for Career Development and Alumni Services. Unfortunately, the low response rate (1.3 percent) forced to exclude these data from this research, just like the only questionnaire received from IPB's leadership.

In order to measure entrepreneurial transformation, a timeline analysis is used. This is a qualitative, participatory method in which respondents are asked to indicate when important changes occurred.

As a next step, quantitative indicators were chosen for comparison with other universities. A first source has been the NIRAS survey (NIRAS, 2008), allowing to compare IPB with universities in Europe. Next, three output indicators were used:

- The total number of student start-ups over the last three years scaled to the total number of students: a higher number is expected to occur in more entrepreneurial universities;
- The percentage of funding generated by the university through spin-offs, business development services, and joint ventures (of the total university budget): a higher percentage is expected to occur in more entrepreneurial universities;
- The percentage of externally sponsored research (of the total research budget), which is also one of the NIRAS indicators: a higher percentage is expected to occur in more entrepreneurial universities.

These indicators have been purposefully chosen for several reasons. First, the number has been restrictive in order to have the highest probability that data would be easily available at any university. Secondly, all three in togetherness cover a large component of the European Commission/OECD framework, thus may be a good indicator of the overall entrepreneurial status of a university: the number of student start-ups is related to 'entrepreneurial teaching and learning' as well as 'supporting entrepreneurs' and is in particular relevant in a context – like in Indonesia – that prioritises entrepreneurship development among students and graduates. The period of counting the number of start-ups is set to the last three years in order to avoid biased yearly fluctuations. Funding generated by a university through spin-offs, business development services, and joint ventures implies that these business development activities are taken place, hence relates to the framework categories 'university strategy', 'organisational capacity', 'supporting entrepreneurs' and 'knowledge collaboration'. Last, externally sponsored research implies that stakeholders are interested in knowledge generated by the university, hence 'knowledge exchange and collaboration' exists, which is a fundamental aspect of being an entrepreneurial university.

Data comparison took place as follows: first, the NIRAS-derived indicators of IPB were compared with the result of the 2008 European survey. Second, all 77 Indonesian public higher education institutions, among which IPB, that participated in the student start-up scheme of the Ministry of Education were compared by using the student start-up indicator. Excluded is one university that in 2015 changed its status from private to public (Ministry of Research, Technology and Higher Education, 2017). Student start-ups is defined by the assumption of winning and subsequently funded business ideas. Thirdly, comparison on all three indicators was possible among a more heterogeneous group of 16 universities in Asia, including IPB. These data were collected in the framework of a training on 'Entrepreneurial University Transformation in South-East Asia' (MSM, 2016).

Main findings

Students and teaching staff had in general a positive perception of the entrepreneurial status of IPB. Table 2 shows that all values (but one) were beyond the average of 3.5 indicating that the respondents scored more positive than negative on statements about entrepreneurial characteristics of the university. No significant differences have been found by sex or number of years working at IPB with *t*-tests analyses. A paired comparison shows that students and teaching staff had in general significantly different views of IPB's entrepreneurial status. The students scored the highest; teaching staff were less positive than the students.

Table 2: Perception of students and teaching staff on IPBs entrepreneurial status, total Mean per category of the entrepreneurial university framework (6-points Likert scale)

	Students (n=258)	Teaching staff (n=51)
1. Leadership & Governance	4,27	4,04
2. Organisational Capacity	4,09	3,84
3. Entrepreneurial Teaching and Learning	4,22	3,93
4. Preparing & Supporting Entrepreneurs	4,15	3,49
5. Knowledge Exchange & Collaboration	4,18	3,95
6. Internationalisation	3,99	3,97
7. Impact measurement	4,16	3,43

Source: authors

University leadership[8]

The content analysis of university documents as well as the information obtained in interviews and focus group discussions indicated that for more than a decade, the IPB leadership has been following a consistent strategy of creating a more entrepreneurial university. This was reflected in the vision of the university that explicated the entrepreneurial research-based focus of IPB. In the period 2008 - 2012 IPB envisioned to become a world class research university with core competences in tropical agriculture and biosciences with entrepreneurial characteristics. IPB's 2013 – 2018 vision emphasised more on down-streaming of innovation.

Organisation-wide understanding of the implications of this leadership vision seemed however limited. Information was missing – or not understood – explaining the expectations to each employee and the desired results. This resulted in three ideas that existed among the IPB community on what entrepreneurship implied for IPB: **I)** One dominant stream was focusing on commercialisation of faculty-based technology-oriented research through patents; **II)** Other people referred to the development of entrepreneurial characteristics of students, to be reflected in all educational programmes; and **III)** Also existent widely among staff and students was a more narrow definition of entrepreneurship development: entrepreneurship was considered to be important, but to be addressed in extra-curricular activities or specific entrepreneurship courses.

Research-based commercialisation

In line with the national strategy of the Ministry of Research, Technology and Higher Education to provide widely applicable innovation (Ministry of Research, Technology and Higher Education, 2015), the IPB leadership has been focusing successfully on commercialising faculty-based technological research (see table 3). This resulted in the mentioned national awards and improved QS ranking as rewarding milestones. Food, renewable energy and medicine were three of the seven long term (2005-2025) research foci of the ministry, around which IPB also focused its research (IPB, 2014). Leadership underscored also the responsibility of IPB as public university to contribute to the development of the country and of the ASEAN region, which is reflected in 33 innovations used for community development in 2016 (IPB, 2017).

An organisational structure and procedures have been set-up to streamline IP-issues, prioritise most relevant research, and to maximise patent outputs. In addition, the IPB holding company (Bogor Life Science and Technology, BLST) has been strengthened as the vehicle for commercialisation of patents, acting as the linking pin between the university research and business. A start has been made with developing the IPB science park, with

[8] See appendix eight for quotes from interviews and focus group discussions

incubation facilities, offices, and businesses. This coincides with the findings of Payumo *et al.* (2013) about how IPB was managing intellectual property as a manifestation of research-driven entrepreneurial developments. They showed that sales of IPB's trademark registered natural-based, herbal and fast food products have been increasing. IPB facilitated patent registration, incentivised researchers with 40 per cent of royalties, and used the number of patents as one of its key performance indicators.

Table 3: Commercial and public use of IPB research

	Baseline (2015)	Target 2016	Realisation 2016
Commercialised innovations	3	10	9
Innovations used by community	26	25	33

Source: authors

The information obtained from interviews indicated that the Achilles heel in the IPB commercialisation approach seemed to be university-business relations. Partnerships with businesses were limited, and businesses were hardly involved in the knowledge generation process. The dominant mindset of the IPB officials responsible was on 'knowledge transfer' not on 'knowledge generation' or 'co-creation'. The applicability of IPB's inventions and the market orientation of researchers was limited. The focus has been more on quantity than on quality and usability, as also indicated by Payumo *et al.* (2013). They warn for a 'patent number trap' because "The increase in patent numbers does not necessarily indicate that IPB's innovation outputs are contributing to economic growth".

Learning and teaching processes

Many IPB students had a micro-business out of financial necessity, and many faculty members had their individual consultancies. This implies that an entrepreneurial spirit and experience was present within the IPB community. However, the number of students that continued their money-earning micro-business after study was limited and students' interest in entrepreneurship was declining during study.

Furthermore, consultancy work of faculty was mainly outside the university as an individual revenue-generating activity. At IPB level, there was no strong push, human resource policy, or coordination mechanism to alter this situation. This resulted, in combination with the fact that the majority of IPB faculty was spending most of their time on teaching, in the situation that faculty did not see a connection between their daily work and IPB's entrepreneurial strategy which prioritised commercialisation. In addition, market oriented transdisciplinary or multidisciplinary academic programmes were scarce at IPB, with staff and faculty feeling primarily loyal to their department.

Leadership indicated that it was supporting entrepreneurial behaviour from staff and students, however faculty did not feel incentivised – and sometimes even stated to be hampered by internal regulations - for spending time on coaching and training students beyond lecturing, or on developing new, more entrepreneurial courses. Development of students' entrepreneurial skills and attitude was considered important, but operationalisation was scattered. Limited attention was given to making the teaching and learning processes more entrepreneurial and almost all entrepreneurship development activities were extracurricular. However, neither students nor faculty had time for these extracurricular activities.

Timeline analysis

The findings described above are indicating the situation at IPB in 2015, early 2016. Transforming a university to become more entrepreneurial is however a process of many years, and often starts because of a sense of urgency (Clark, 1998; Clark, 2004). Respondents were asked to indicate important milestones over a period of ten to 20 years (see table 4).

The table reflects the findings above, demonstrating an important role of the university leadership, a consistent focus on commercialisation (started in 1999 with the establishment of the IP office), and less attention for the teaching and learning processes. A few early initiatives have taken place, like the 1994 establishment of the Incubator Center, but these remained sporadic activities without institutional impact. The entrepreneurial transformation process ignited in 2000 with the implementation of the autonomous status of the university (BHMN) granted by the government of Indonesia. This autonomy paved the way for many internal changes, including the creation of a Board of Trustees and an academic senate, and streamlining of the university's organisation. Most importantly was that it allowed IPB to manage its own resources (Payumo *et al.*, 2013). As a direct result, the IPB leadership established in 2003 the university holding company BLST.

Table 4: Timeline of the IPB entrepreneurial transformation process by categories of the European Commission/OECD framework

	Before 2000	2000 – 2004	2005 - 2009	2010- 2014	2015 - 2016
Leadership and Governance			2008: Entrepreneurship in the mission; New position created of Vice Rector for Business	2010: Start student selection a/o using entrepreneurship criteria; 2013: Research-based university	2015: CEOs in Advisory Board
Organisational Capacity		2000: Government Regulation No 154/2000 on autonomy status of IPB (BHMN)			
Entrepreneurial Teaching and Learning	Early 1980s: entrepreneurship teaching at Department of Postharvest Technology; 1998: 'Entrepreneurship and Small Business Management' as core subject for Agribusiness Major		2005: Introducing mandatory BSc course Entrepreneurship Introduction		
Preparing and Supporting Entrepreneurs	1994: Establishment Incubator Center	1999: Establishment of the IP Office; 2003: Establishment of BLST, IPB's holding company	2008: Start Business Innovation Center / IP innovation process; 2009: Start Business Plan Competition students	2014: Foundation IPB Science Park	2015: IPB Incubator founded; Investment Summit
Knowledge Exchange and Collaboration			2007: Implementation of Agribusiness Development Center (In cooperation with ICDF-Taiwan)	Series of exhibitions and ABGC meetings (Academician-Business-Government-Community)	2015: Investment Summit; 2016: Launch of the Open Innovation Platform
Internationalisation			2007 onward: cooperation with international partners in commercialisation of IPB's innovations		
Impact measurement				2011: Implementation of BSC	2015: Implementation of TRL (Technology Readiness Level) on products of innovation

Source: interviews and content analyses of IPB documents

Quantitative indicators: NIRAS

Part of the above is illustrated by the quantitative indicators derived from NIRAS (2008), see table 5. Only a limited percentage of students followed a degree-based entrepreneurship course (excluding participation in the compulsory introductory course in year one of the Bachelor study). The participation of students in extracurricular programs was high because of group-based participation in business competitions where students could win a grant.

The number of granted patents is an indication of the focus of IPB on research, a number that increased over time (Payumo *et al.*, 2013). Funding by non-government sources was limited: financial need had not been driving the commercialisation agenda of IPB, being almost fully central-government funded. However, recently the Indonesian government has started to reduce the budgets for universities, which will give more importance to generating additional revenues.

Table 5: IPB indicators, compared to the results of the 2008 NIRAS survey among European universities

Entrepreneurial students through education	IPB 2015	NIRAS 2008
Share of students enrolled for entrepreneurship courses as percentage of total amount of students	4%	13%
Number of students	590	1104
Knowledge transfer to society		
Number of patents: 2010 – 2015	63	-
% external funding	4,80%	-
Entrepreneurial students through practice		
Number of students participating in extra-curricular entrepreneurship activities	2500	357

Source: NIRAS 2008; authors

Quantitative output indicators: comparing IPB with other Indonesian and Asian universities

The high number of IPB students that participated in business competitions is reflected in the only indicator on which data could be found from all public universities and public vocational institutions in Indonesia, i.e. the total number of student start-ups over the last three years scaled to the total number of students, measured through government grants received. The data of 77 institutions are presented in figure 1. IPB scores 0.778, which is part of the ten per cent highest scoring public higher education institutions. The overarching majority of these public institutions score low on this indicator: 83 per cent less than 0.5. This implies that the overarching majority of Indonesian public higher education institutions had very few students who managed to get a government grant for a business start-up proposal. In absolute numbers: 37 of the 77 public higher education institutions had less

than ten students winning a grant over the last three years. IPB is part of the group of top ten institutions (all public universities) that had more than 100 students winning a grant (with Universitas Gadjah Mada and Universitas Brawijaya best performing with both more than 200 students winning a grant over the last three years).

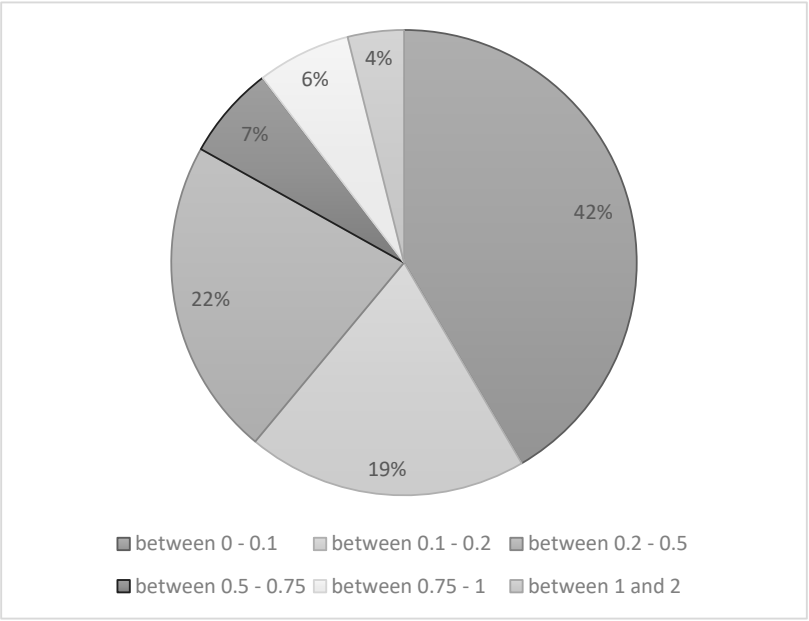

Figure 1: Number of start-ups scaled to number of students, period: last 3 years x100, N = 77 public higher education institutions.

As an additional analysis, the scores have been grouped by the 58 public universities and by the 19 vocational institutions ('Sekolah Tinggi' and 'Politeknik'), subdivided by year of foundation (see table 6). The threshold between older and younger institutions is set at founded before or after 1990, which is roughly 25 years ago. In the Asian context with relatively young nations, this is considered to be a more appropriate threshold than the threshold of 50 years as used by the QS ranking of top young universities. A difference in findings was expected because the vocational institutions are far smaller than most of the universities (in terms of student populations), and because of their different, skills oriented study programmes. In addition, it was assumed that younger institutions might be more geared towards stimulating entrepreneurship.

The contrary is however the case if based on the student start-up indicator. The two higher scores are fully absent among the group of younger public universities (threshold: founded in 1990 or more recently). IPB, founded in 1963, is part of the 17 per cent highest scoring, older public universities. In absolute numbers: IPB is part of the top five older, public universities from the total of 43 older, public universities. The same pattern is visible among

the vocational institutions (note that only two vocational institutions are founded more recently than 1990). In addition, the findings do not underpin the hypothesis that vocational institutions would score different from universities (p=0.3629, two-sample Wilcoxon rank-sum test).

Table 6: Number of start-ups scaled to number of students, period: last three years x 100, N = 77; by type of university and by year of foundation

	Public universities (N=58)		Public vocational institutions (N=19)	
	Founded before 1990 (n=43)	Founded in 1990 or more recent (n=15)	Founded before 1990 (n=17)	Founded in 1990 or more recent (n=2)
Between 0 - 0.1	28,0%	73,0%	59,0%	50,0%
Between 0.1 - 0.2	26,0%	9,1%	5,9%	50,0%
Between 0.2 - 0.5	30,0%	9,1%	12,0%	0,0%
Between 0.5 - 0.75	6,4%	9,1%	5,9%	0,0%
Between 0.75 - 1	6,4%	0,0%	12,0%	0,0%
Between 1 - 2	4,3%	0,0%	5,9%	0,0%
More than 2	0,0%	0,0%	0,0%	0,0%

Source: authors

Comparable data of Indonesian private universities are not shared in the public domain and only available on request. Limited additional data obtained in this study hint at private universities performing better on this indicator than public universities: two universities score between one and two, and one university scores far above two, a high score that is absent among the public universities. The university that only recently changed from private to public status, scores between one and two. For comparison, the University of Twente (UT), considered to be one of the international benchmarks for entrepreneurial universities and mentioned by the IPB Vice Rector as reference point, scores between one and two which is in the same category as the two best Indonesian public universities (University of Twente, 2017).

Also internationally, IPB is part of the better performing universities on number of student start-ups. The number of IPB student start-ups financed by government grants scaled to number of students (0.778) is compared with the number of start-ups scaled to number of students of 15 Asian public and private universities (located in Bhutan, India, Indonesia, Nepal, the Philippines, Sri Lanka, and Vietnam[9]). This comparison shows that IPB is part of the 31 per cent highest scoring universities (5 out of 16), see figure 2. The two highest scoring universities are private universities.

[9] Bhutan: Royal University - Bhutan Business College, Royal University, Royal Thimpu College; India: University Institute of Information Technology, Himachal Pradesh University; Indonesia: National Institute of Technology, Undiknas University; Nepal: Sagarmatha Engineering College, Academy of Policy and Development, Pokhara University; Philippines: ASU, Ateneo de Zamboanga University, Caraga State University, CBSUA, Eastern Visayas State University; Sri Lanka: University of Sri Jayewardenepu

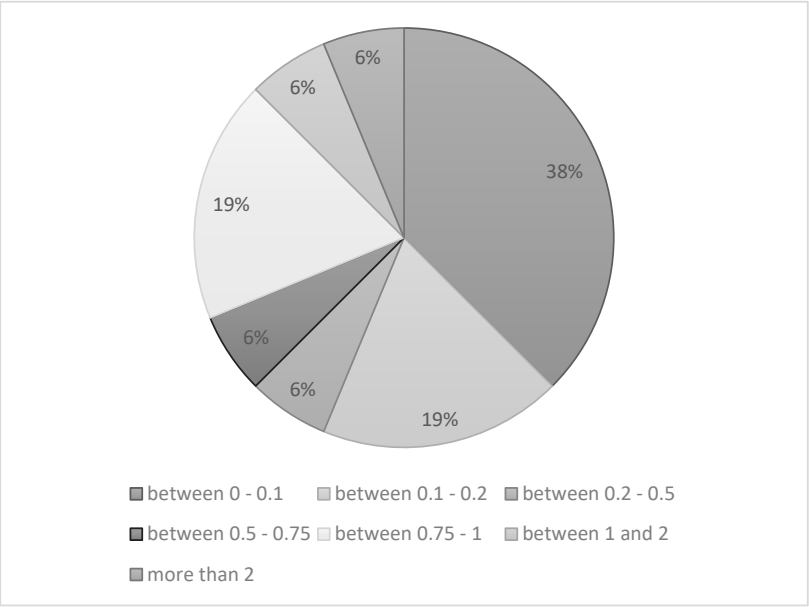

Figure 2: Number of start-ups scaled to number of students, period: last three years x100, N = 16 universities in Asia, among which IPB.

In addition to the data on student start-ups, data on the two financial indicators could be obtained from the same Asian universities, see table 7. IPB is scoring relatively low on both indicators within this group of universities, which reflects IPB's reliance on central-government funding. Analysis of the data results in no clear patterns. Neither if sorted by public or private university (p=1.000 for the funding through business-indicator; p=0.3005 for the research-funding indicator) nor if sorted by year of foundation (with as threshold the year of 1990) (p=0.7506 for the funding through business-indicator; p=0.5618 for the research-funding indicator). Correlation between the two financial indicators is weak, but positive (r=0.18; p = 0.5047).

Table 7: Percentage funding by university spin-offs etc. of total annual budget (2015/2016) and percentage of externally funded research (of total research budget 2015/2016), N = 16 Asian universities

University	Year of foundation	Public or private university	% funding generated by the university through spin-offs, business development services, joint ventures (year-1)	% of externally funded contract research as proportion of total research budget
Eastern Visayas State University, Philippines	1907	Public	25%	1,50%
CBSUA, Philippines	1918	Public	0%	60%
Ateneo de Zamboanga University, Philippines	1952	Public	10%	35%
University of Sri Jayewardenepu, Sri Lanka	1959	Public	11%	14,50%
ASU, Philippines	1963	Public	0,60%	82,41%
IPB, Indonesia	1963	Public	5%	19,47%
Himachal Pradesh University, India	1970	Public	9%	70%
National Institute of Technology,Indonesia	1972	Private	2%	70%
University of National Education, Indonesia	1996	Private	18%	86%
Pokhara University, Nepal	1997	Public	40%	35%
Royal University of Bhutan	2003	Public	2,63%	57,18%
Business College, Royal University of Bhutan	2008	Public	0%	0%
Academy of Policy and Development, Vietnam	2008	Public	0%	70%
Royal Thimpu College, Bhutan	2008	Private	10%	100%
Caraga State University, Philippines	2009	Public	26%	93%
Sagarmatha Engineering College, Lalitpur, Nepal	2010	Private	0%	0%
Mean			**10%**	**50%**

Source: authors

When the results on all three indicators are plotted together in one graph (see figure 3), it becomes clear that there is no similar pattern among values of the three indicators. In the case of IPB (number 8 in the graph) the indicator for student start-ups is among the highest in this group, whilst it scores relatively low on the financial indicators. The findings indicate that if these indicators are to be used to measure the entrepreneurial status of a university, different, possibly opposing conclusions can be drawn for the same university.

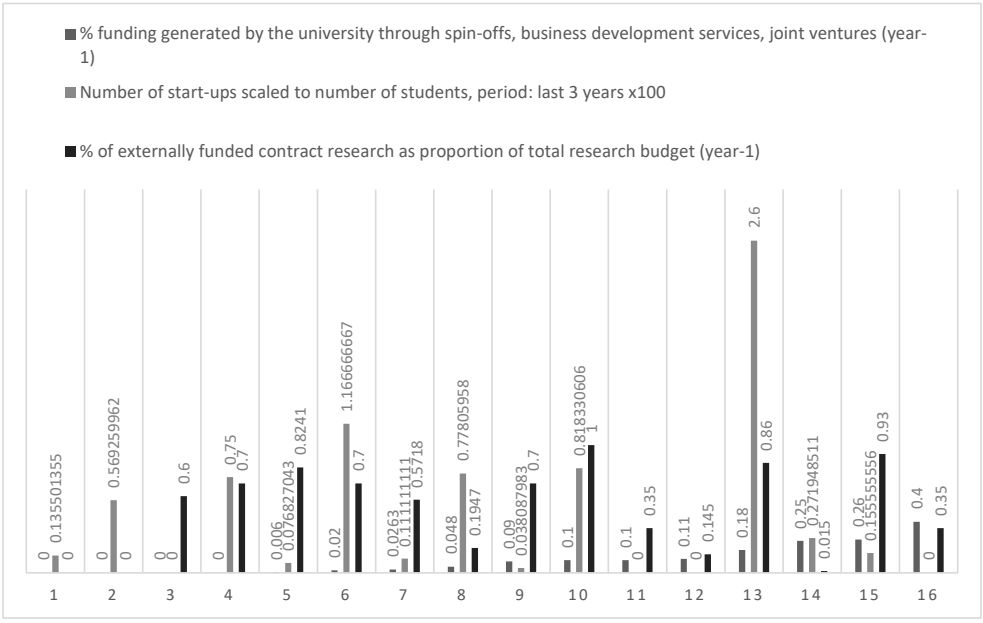

Figure 3: Results on 3 output-indicators, N = 16 public and private universities in Asia, among which IPB (number 8).

Discussion

The findings of the IPB assessment, as presented above, lead to the main conclusions that the leadership at IPB is – and has been - stimulating a change into a more entrepreneurial university with a focus on commercialisation of faculty-based research. IPB is entrepreneurial in this sense and can demonstrate tangible results. In addition, qualitative information indicates that the entrepreneurial development of the learning and teaching processes at the time of data collection was lagging behind, however when quantitatively assessed, the student entrepreneurship output is high in relation to many other universities.

IPB is a good illustration of research-based technology transfer and innovation as advocated by Etzkowitz (Etzkowitz, 2004; Etzkowitz, 2016), but the picture is more mixed from the perspective of Clark's broader institutional perspective (Clark, 1998; Clark, 2004) as assessed with the European Commission/OECD framework. Relating the findings to the definition of entrepreneurial university (Gibb, 2013), it can be concluded that 'empowering its staff and students to demonstrate enterprise, innovation and creativity' is positive considering the commercialisation of faculty-based research and number of grants for student start-ups, but still needs more attention. In addition, IPB is weak in the 'use of knowledge across boundaries' with its academic processes predominantly mono-disciplinary organised. Concerning 'creating public value via a process of open engagement, mutual learning,

discovery and exchange with all stakeholders in society' IPB is strong in support to community development, but knowledge creation through partnerships is limited.

IPB is an example of the top-down and university-led model as identified by Graham (2014) in a study among world's most highly-regarded entrepreneurial universities. This model is 'typically triggered by the desire to realise income from university research' with a focus on technology transfer. Graham stresses that this may lead 'to a culture where "only university-protected IP is seen as worthwhile" on the expenses of among others student-based entrepreneurship, which concurs with the IPB findings. Interesting is that this possible downside of a commercialisation focus is neutralised in the case of the National University of Singapore through internal coordination, directly linking education and student focused entrepreneurship with the high-tech commercialisation agenda of the university (Wong, Ho and Singh, 2007). These 'communication and coordination systems' (Nelles and Vorley, 2010) are yet to be improved at IPB.

The case of IPB also illustrates that entrepreneurial transformation needs momentum where an external trigger coincides with visionary campus leadership. At IPB, the spark was the autonomy status and the related option of reducing government funding. IPB's leadership pro-actively responded and turned this threat into business opportunities. Similar imperatives for change were behind the success story of the University of Twente and the National University of Singapore, as well as mentioned in the case of the University of Terbuka (Wong *et al.*, 2007; Damayanti and Zuhairi, 2009; Feenstra and Hofste, 2016). The UT underwent a change process out of pure necessity: dislocated in the East of the Netherlands, the number of students was too limited at a time that government was starting to diminish funding. The entrepreneurial development ignited with new central leadership that had a vision, perseverance and power to make it happen.

In the search for indicators for the entrepreneurial status of a university that also would allow university-university comparison, the assessment shows that IPB used the number of (commercialised) patents as indicator for entrepreneurial commercialisation (as part of the Balance Score Card and one of the NIRAS indicators). The legitimate question is what and how to measure results and impact of the entrepreneurial strategy beyond this indicator. If university-based entrepreneurial growth is a priority, university performance metrics need to be revised to reflect this. This study contributed in this debate by testing three quantitative indicators derived from the European Commission/OECD framework. A choice has been made to come up with output indicators that measure direct results of entrepreneurial actions by the university. It is assumed that such data can be collected by universities relatively easy. Throughput, the internal entrepreneurial process, is measured by two of the NIRAS indicators, i.e. Share of students enrolled for entrepreneurship courses, and Number of students participating in extracurricular entrepreneurship activities. In the

understanding that entrepreneurial universities are meant to contribute to the (socio-) economic development of the region in which they operate (Gibb, 2013), measuring impact would be appropriate as well, but methodologically more complex.

The findings indicate that although seemingly objective, interpretation of results can still be highly context specific. This is in line with studies from Tijsen (2006), Foss and Gibson (2015), and reflected in the predominant methodological approach of using case study research with a perception-based framework for understanding entrepreneurial universities. This is true for the two financial indicators, but less for the start-ups indicator.

If strengthening student entrepreneurial behaviour is of importance, which is the case in Indonesia and many other countries (Abduh *et al.*, 2012), then the start-ups indicator seems a doable, straightforward indicator: it gives an idea of the conducive environment that allows students grasping a (financial) opportunity. This indicator is related to two categories of the European Commission/OECD framework: 'entrepreneurial teaching and learning' and 'supporting entrepreneurs'. It cannot be causally related to 'university strategy and governance', because the number as such gives no information to what extent the student' activity is because of a deliberate university policy. Furthermore, it gives no indication on how good, hence viable, these start-ups are. A related output indicator – not used in this study – is the (weighted) number of start-ups actually started, or still operational after a certain period of time. Currently, only a limited number of universities collects and discloses such information.

Seemingly, when measuring the results of entrepreneurial knowledge generation (the 'Knowledge Exchange and Collaboration' category of the European Commission/OECD framework), the percentage of external research funding is a logical output indicator. However, the results of this study indicate that this indicator may be affected by external factors like for instance governmental regulations and funding opportunities. The same can be said for the other financial indicator: the percentage of income out of spin-offs, business development services, and joint ventures. At IPB, spin-off companies are (co-)owned by the university, generating income for the mother institution. But for instance at the University of Twente, considered to be one of the most entrepreneurial universities globally, spin-off companies are not owned by the university. As a result, income out of spin-offs is negligible: the university supports and promotes spin-offs, but all revenues stay within these commercial entities and are for individual university staff that is involved (University of Twente, 2017b). Hence, it is incorrect to base a conclusion on the entrepreneurial status of a university solely on this indicator. A single indicator may only have value to measure the status of a specific aspect of the entrepreneurial university framework.

Given the importance of multi-stakeholder knowledge exchange and partnerships for entrepreneurial universities in the European Commission/OECD framework and the work of Etzkowitz (Etzkowitz *et al.*, 2000), which coincides with recent literature positioning the university as one of the actors in an entrepreneurial ecosystem (Mason and Brown, 2014), other possible output-indicators, to be validated, are: the estimated number of active partnerships with private sector and government, the number of industry scholarships for students and teaching staff, the number of joint university-industry centers, labs, educational programmes and institutes, or the number of joint research publications with an industry partner.

Conclusions

In the present study, the authors used the European Commission/OECD framework to assess the entrepreneurial status of IPB. This framework is useful because of its holistic perspective and standardised approach, which allows for comparison and learning within and among universities. The magnitude of the framework however complicates an assessment and necessitates a costly, multi-methods approach to interpret the perception scores. This study indicated that it is difficult to come up with a simpler, quantitative framework that results in context-independent comparative data. And that it is difficult to attribute entrepreneurial outputs to intended university strategies and activities. More testing of several quantitative indicators on their relevance and interpretation in different contexts is needed. Methodologically even more complex is to measure the impact of entrepreneurial universities on socio-economic development, an area of research that needs much more attention[10].

In addition, capturing of an organisational transformation process requires a longitudinal approach, collecting similar data over time. Whilst these data are often not available, a timeline analysis as used in this study is a way to explore the causes of entrepreneurial changes. The authors recommend to integrate this methodology in researching transformation processes.

The results of this study have relevance for the higher education community in terms of understanding the complexity of transforming institutions into more entrepreneurial organisations in Asia. To the best of the authors' knowledge, there is not any previous study that examines entrepreneurial characteristics of universities in Indonesia in this comprehensive manner.

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[10]See appendix six for an overview of quantitative indicators.

The study has also relevance when put in the context of the global trend from faculty-based technology transfer towards student-based entrepreneurship, stimulation of creativity, and the development of entrepreneurial ecosystems (Wright and Kelly at the UIIN conference 2016, non-published). Stimulating creativity among students in a conducive environment is supposed to have a far-reaching impact on social and economic development, because this creativity is the foundation for innovation. With its high number of grants for student start-ups, IPB seems on the right way.


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Chapter 3

Entrepreneurial Change in Government-led Development: Ethiopian Universities[11]

Mudde, Huub L.M., Van Dijk, M.P., Gerba, Dugassa Tessema, and Alemfrie, Derese Chekole

[11] *Mudde, H.L.M., Van Dijk, M.P., Gerba, Dugassa Tessema and Alemfrie, Derese Chekole (2019). Entrepreneurial Change in Government-led Development: Ethiopian Universities. Higher Education, Skills and Work-Based Learning. Emerald, https://doi.org/10.1108/HESWBL-07-2018-0073*

Abstract

Entrepreneurship development is a priority in many African countries as an instrument for employability of the predominant young populations towards which universities are expected to contribute considerably. This chapter answers the research question to what extent Ethiopian universities can be considered to be entrepreneurial and explains possible differences among these universities. The study is inspired by a mixed methods research at nine universities in Ethiopia applying the entrepreneurial university framework of the European Commission/OECD: a content analysis of university policy and educational documents, a structured survey with 203 respondents, in particular staff and students, and in-depth interviews and focus group discussions with 223 people comprising university top-management, faculty, students, and external stakeholders. Findings indicate that entrepreneurial activities in Ethiopian universities are at their infant stage with limited differences among the universities. The universities are operating in a top-down, central governmental-led development that is not enabling entrepreneurial behaviour at the level of the individual institutions. There is a tension between a strong say of the government in university operations and creating an autonomous, integrated entrepreneurial culture. The authors argue that within this context, leadership is the lever for an entrepreneurial turn at the universities. The results of this study have relevance for the higher education community in terms of understanding the complexity of transforming institutions into more entrepreneurial organisations in Africa.

Introduction

Ethiopia is the second most populous country in Africa with about 100 million people of which 64 percent is below 25 years of age, with a net population growth of 2.89 percent (CIA, 2016b). Despite the firm economic growth (a GDP growth rate of 10.2 percent in 2015 and 10.3 percent in 2014) (CIA, 2016b), Ethiopia is facing high unemployment among its young population, in particular in urban areas (Broussar and Tekleselassie, 2012). The official national unemployment rate in 2015 was 16.8 percent (Trading Economics, 2016).

The government of Ethiopia wants to improve access to higher education institutions, but has no capacity to absorb all the people who graduate from the institutions (FDRE, 2015). It expects graduates to create employment opportunities for themselves. In this context, higher education institutions started offering entrepreneurship courses in a few programmes including business studies and educational management as a way to develop the entrepreneurial mindset of graduates. However, making students more entrepreneurial requires also an entrepreneurial university (Röpke, 1998; Kirby, 2006; IPB, 2012; Fayolle and Redford, 2014). This study therefore focuses on the research question to what extent universities in Ethiopia can be considered to be entrepreneurial.

Literature reveals no information on entrepreneurial universities in Ethiopia except one. Habtamu (2016) concludes that the entrepreneurial behaviour at Addis Ababa University was weak. The few related publications focus on entrepreneurship education, or the development of entrepreneurial mindsets of students (Bereket and Wasihun, 2015). This research gap was the basis for this study by Mudde, Tessema and Derese (2015) to understand how Ethiopian universities can strengthen their entrepreneurial policy and activities. In this study, the assessment framework for European entrepreneurial Higher Education Institutions named HEInnovate (European Commission and OECD, 2013) is applied and Gibb's definition of entrepreneurial universities has been used (2013). It refers to an academic organisation that is designed for staff and students to 'demonstrate enterprise, innovation and creativity', that creates public value, partners with local, regional, national and international stakeholders, and is able to effectively operate in a dynamic context.

This chapter first reviews literature on entrepreneurial universities, and describes the research methodology used. Next, it presents the main findings and ends with a discussion and conclusions.

Literature review

There is wide agreement among scholars and policy makers about the importance of knowledgeable, experienced and skilled entrepreneurs for innovation, employment creation

and economic growth. Entrepreneurship development is directly linked with regional and national economic development and industry policies (Röpke, 1998; Naudé, Szirmai and Goedhuys, 2011). Fostering entrepreneurship and entrepreneurship education have become topics of high priority in public policy in the industrially developed and developing world (Luthje and Franke, 2003; Mitra and Matlay, 2004).

The notion that an entrepreneurial university is conducive for making students more entrepreneurial is widely supported. In 1998, Röpke stated that a university itself needs to become entrepreneurial for faculty, students, and employees to turn into entrepreneurs. An important feature of an entrepreneurial university is that the organisation is designed to encourage and support individual entrepreneurial behaviour (Clark, 2004; Coyle, Gibb and Haskins, 2013; Aranha and Garcia, 2014). In fact, the concept of entrepreneurial university defines the functioning of an institution through entrepreneurial attributes. Thus, an entrepreneurial university is an institution that is designed for and demonstrates attributes like intuitive decision making, the capacity to make things happen autonomously, networking, initiative taking, opportunity identification, creative problem solving, innovative, future - and achievement orientation, willingness to take reasonable risks, and perseverance (Coyle *et al.*, 2013; Morar, 2013). Kirby (2006) is focusing more on the cultural entrepreneurial aspects of the institute in combination with the individual mindset and skills as a precondition for entrepreneurial behaviour. He states that for an individual to act entrepreneurial, there needs to be a setting with a 'favourable attitude' towards entrepreneurship, the belief that he or she is able to act entrepreneurial, and the 'belief that entrepreneurship is intrinsically rewarding'.

But an entrepreneurial university is more than geared towards stimulating individual entrepreneurship. It is considered to be an answer to many challenges faced by higher education institutions, in particular the growing number of students vis-à-vis limited resources, the demand for contributing to economic growth with innovation and knowledge generation, the information and communication technology revolution, and globalisation (Gibb, Hannon and Robertson, 2009, updated 2012; European Commission and OECD, 2012; Coyle *et al.*, 2013; Gibb, 2013). The entrepreneurial university is perceived to be able to cope with these challenges by innovation in research, knowledge exchange, teaching and learning, governance and external relations (European Commission and OECD, 2012).

Literature reveals different frameworks for the entrepreneurial university (Clark, 1998, 2004; Etzkowitz, 2004; Kirby, 2006; Rothaermel, Agung and Jiang, 2007) highlighting a variety of factors that affect entrepreneurial transformation. An essential driver of a long-term transformation process that is mentioned by many is an entrepreneurial strategic intent (Clark, 1998, 2004; Vorley and Nelles, 2009; European Commission and OECD, 2012; Foss and Gibson, 2015). Besides the importance of strategy, Vorley and Nelles (2009) identify

four other internal, interacting factors that shape an entrepreneurial university. These factors are I) structures, like technology transfer offices, incubators, technology parks, and business portals, II) systems, that facilitate the communication and configuration of linkages between structures, III) leadership of most influential persons including administrators, board of directors, department heads, and 'star scientists', and IV) the university culture with its institutional, departmental and individual attitudes and norms.

The importance of leadership as one of the crucial dimensions that shape the entrepreneurial agendas of universities is widely stressed and reflected in most of the frameworks (Vorly and Nelles, 2009; European Commission and OECD, 2012; Coyle *et al.*, 2013; Gibb, 2013). Foss and Gibson (2015, p. 254) stress the importance of the 'combination of exceptional leaders' and 'an initial impetus for change' derived from the university context. Clark (1998) refers to 'a strong central steering core' to embrace management groups and academics. Leih and Teece (2016) identify entrepreneurial leadership through three types of capabilities, sending, seizing and transforming. Sensing is about recognising opportunities, identifying (global) trends, and 'recognising threats that impact student enrolment, faculty retention and the quality of services'. Seizing captures capabilities needed for ensuring the implementation of timely and good execution of the best initiatives. Last, transforming capable university leaders are able to change the campus culture, build unconventional partnerships, and 'shut down poorly performing programmes and departments'. In their search for what entrepreneurial means for university leadership, they stress the 'ability to connect the university externally and internally, and to do what is necessary to unite the campus around new mandates and exigencies'. Rothaermel *et al.* (2007) come to a similar view, describing entrepreneurial universities being managed in such a way that they become capable of responding flexibly, strategically and yet coherently to opportunities in the environment.

Three other factors of importance for entrepreneurial transformation of universities are funding, engagement with society and discretion. Globally, public funding of higher education becomes increasingly constrained, with the same amount or less money available for more students and more, bigger institutions. This leads to an immediate pressure on universities to act more entrepreneurially. Universities have to raise their revenues and cut on costs (Clark, 2004; European Commission and OECD, 2013). Another important factor is the degree of engagement with society. Etzkowitz (2004) indicates that the real lever towards becoming an entrepreneurial university is the interaction with industry (and government). He coined the Triple Helix model (Etzkowitz and Leydesdorff, 2000) that describes the interaction among university-industry-government at various levels: local, regional, national and multi-national. A strong 'interdependence', the interrelation with industry and government, is a key phenomenon of entrepreneurial universities (Etzkowitz, 2004; Clark, 2004). Thirdly, literature stresses the need for – a certain degree of – autonomy to educational institutions and for individual staff to become entrepreneurial (Clark, 1998,

2004; European Commission and OECD, 2014). Universities have to be able to take decisions on matters such as academic innovation, financial investment, and organisational adaptation. They need to be agile to meet the ever-changing demand in society (Gibb, 2012). While universities are more interacting with society, they need to become more independent in decision-making (Etzkowitz, 2004; Etzkowitz, Bikkulov, Kovaleinen, Leitner, Poutanen, Grey, Leonchuck, Axelberg, Plonski and Almeida, 2017).

In 2013, the OECD Local Economic and Employment Development Programme together with the European Commission's Directorate General for Education and Culture launched an online self-assessment tool for European entrepreneurial higher education institutions named HEInnovate (European Commission and OECD, 2013). This framework, updated in 2015, is operationalised in seven categories of statements that are considered to be characteristic for an entrepreneurial university: 1) Leadership and Governance; 2) Organisational capacity; 3) Entrepreneurial Teaching and Learning; 4) Preparing and Supporting Entrepreneurs; 5) Knowledge Exchange and Collaboration; 6) Internationalisation; and 7) Measuring impact (see Box 1, Chapter 2). The authors state that HEInnovate is grounded on 'an interwoven and beyond-business concept of entrepreneurship, innovation and institutional change' (European Commission and OECD, 2014). HEInnovate reflects to a large extent the areas that Gibb (2013) considers to be strategic for moving a university to an entrepreneurial model, hence can be considered as an operationalisation of his definition of an entrepreneurial university. These areas are: I) Governance, leadership and organisation structures that are made in response to pressures and opportunities; II) Enterprise and entrepreneurship education; III) Research, knowledge transfer and exchange processes; IV) International competition and cooperation, and V) Stakeholder relationships (Gibb, 2013). The factors as indicated above can also be identified in this holistic framework, however little attention is given to university culture.

Little information is available on key factors explaining differences between entrepreneurial universities. The emphasis is on the diversity of approaches and on identifying common denominators within this diversity (Clark, 1998, 2004; European Commission and OECD, 2012). Differentiating factors that are mentioned are: first, the size of the institutions, measured in number of students. Clark (1998; 2004) indicates that this is a factor of potential relevance, explaining that in larger institutions (more than 13,000 students) creating an institution-wide entrepreneurial culture may be more complex. The second factor is presence of industry. In line with Etzkowitz's (2004) view on the importance of interaction with industry, limited availability of industry automatically limits the possibilities of interactions with universities. Thirdly, the academic profile of the higher education institution. Being a comprehensive university or a technical university, could also explain differences. More entrepreneurial possibilities through industry linkages and more funding opportunities are expected for science and technology based universities (Clark, 1998).

Fourth, the funding base of the institution is considered as an important imperative for change towards a more entrepreneurial university (Clark, 2004; European Commission and OECD, 2014). In this respect, the main difference in the educational sector is public versus private funding.

Entrepreneurial universities in Africa

The majority of the literature concerns universities located in high income countries with some studies on universities in Asia (Wong, Ho and Sigh, 2007; Reyes, 2017; Mudde, Primaswari and Fauzi, 2017). Little is known about entrepreneurial university transformation in Africa. In general terms, authors have indicated the importance for African universities to become more entrepreneurial. Nafukho and Wawire (2004) call for entrepreneurship as a reform agenda for universities in Africa, focusing on income generation. Beugré (2016) in his book on building entrepreneurial ecosystems in Sub-Sahara Africa, contends that universities need to become more entrepreneurial in teaching, research and community service. They need to promote entrepreneurship as an engine of economic development and growth.

Court (1999) describes the case of the University of Makerere in Uganda that managed to come out of a deep crisis through entrepreneurial actions. In the late 1980, University of Makerere was in a devastating state after two decades of tyranny in the country: the infrastructure was destroyed, supplies were absent, student numbers low, and resources were not enough to pay wages. The situation turned around when the University Council allowed teaching to private sponsored students and invested the new income streams wisely for university development. Clark (2004) analyses that the University of Makerere successfully managed to change into a more entrepreneurial university due to entrepreneurial initiatives of the faculty itself ('stimulated academic heartland'), diversification of funding, new leadership and endorsing management decisions and structures ('a strong central steering core'). From a fully state-depended university, University of Makerere had managed to transform in a more autonomous institution with an entrepreneurial culture. He argues that this case is relevant for universities in Africa in general, because 'it shows that expansion and the maintenance of quality can be achieved simultaneously in a context of reduced state funding… It dramatises the point that a supportive political and economic environment is a prerequisite for institutional reform.' (Clark, 2004, pp. 107-108). Last, Clark points at the strong will to change ('institutional volition') that manifested at Makere ('it tried harder than numerous other universities in a roughly similar situation to push for change'). This institutional volition is a pertinent aspect underlying any institutional transformation.

Concluding, not much is known about the entrepreneurial status of African universities. It leaves unanswered the question about the situation in a low income developing country like Ethiopia. This research gap leads to the major research question of this study: How do

these selected universities score on the European Commission/OECD framework and how can possible differences among universities be explained.

Higher Education and Entrepreneurship in Ethiopia

Most of the Ethiopian universities are young. However, developments in higher education in Ethiopia are going fast. Some twenty years ago Ethiopia had only two universities with an enrolment of around ten thousand students. Between 2004/2005 to 2011/2012, the number of public higher education institutions has quadrupled from eight to 33, reaching a total undergraduate enrolment of around 500,000 students (Education Strategy Centre, 2015). The public universities are grouped in three generations. There are eight first generation universities, 13 second generation, and ten third generation universities[12]. In addition, two special universities exist, the Civil Service University and the Defense University. The first generation universities are the oldest, founded in the 1990s or before, the second generation universities are founded around 2006, and the third around 2015. All these universities resort under the Ministry of Education. A specific group of higher education institutions are the Institutes of Technology (IoTs), which usually were Colleges of Engineering. They have a certain level of independence and are purposefully set-up to feed industrial development. They resort under the Ministry of Science and Technology. The number of private higher education institutions has also expanded, to 98 institutions, accommodating around 15 per cent of all students by 2015 (Education Strategy Centre, 2015). Of these 98 institutions only four are considered as universities.

In 2013, a national Entrepreneurship Development Center (EDC) has been established to spearhead the development of entrepreneurship activities in the country. It implements the country's Entrepreneurship Development Program (EDP), a programme launched by the partnership between the government of Ethiopia and United Nations Development Program (UNDP). The centre provides entrepreneurship training programmes and business development support services and contributes to the capacity development of government institutions which are involved in entrepreneurship development. The centre has also provided training to teachers selected from different public universities. It has supported in 2014 five public universities in setting up a Centre of Excellence in Entrepreneurship. The centres are expected to provide full-fledged entrepreneurship development support, including incubation services, for students, staff, and the community.

Recently, the higher education sector in Ethiopia is pushed to strengthen the ability of graduates to find employment by providing skills or preparing them for self-

[12]At the time of study, the foundation of another 11 universities has been announced by the Ethiopian government, the so-called fourth generation universities.

employment through entrepreneurship development. There is an increased interested for entrepreneurship education for undergraduate students, the establishment of Entrepreneurship Development Centres, and initial support to student start-ups. Dugassa (2012) and Kannan (2012) indicate however that the main objective of entrepreneurship education in Ethiopian public universities is to familiarise students with entrepreneurship. Entrepreneurship education with such an objective is not expected to produce graduates with good entrepreneurial skills. Also entrepreneurship educators in Ethiopian universities do not seem suitably qualified and experienced to use enterprise education approaches (Dugassa, 2012; Kannan, 2012).

Methodology

This chapter is inspired by a mixed methods study at nine universities (see table 1) applying the entrepreneurial university framework HEInnovate of the European Commission/ OECD with its seven dimensions already mentioned (2013). The universities, eight public universities and one private university, were purposefully selected from a total population of 37 universities (33 public universities and four private universities). Six public universities have a comprehensive academic profile and two are technical universities. For comparative purposes, one private university has also been included in the sample. Universities have been selected in different parts of the country, in the capital and farther away. Third generation public universities were excluded, because a university needs to be operational at least five years in order to be able to collect useful data for this study. In addition, the Civil Service University and the Defense University were not taken into consideration given their a-typical profile.

Table 1: General profile of the nine universities assessed (status March 2015)

University	Your of foundation	Total number of students (2015)	Total number of academic staff (2015)	Academic Profile	Distance to Addis Ababa (in km)
Adama University	(1993) 2006	10.440	638	Technical Institute	90
Addis Ababa University	1950	48.673	2408	Comprehensive & Technical Institute	0
Aksum University	2006	> 12,000	> 895	Comprehensive	1028
Dire Dawa University	2006	12.500	746	Comprehensive	500
Jimma University	(1952) 1999	42.917	1538	Comprehensive	352
Mizan-Tepi University	2006	> 9,500	677	Comprehensive	565
Unity University	1991	5.193	76	Comprehensive, private university	0
Wollega University	2006	> 26,000	830	Comprehensive	331
Wollo University	2006	13.076	234	Comprehensive	390

Source: Institutional websites and strategy documents

Data were collected per university from four categories of respondents: the leadership (presidents and vice-presidents), academic staff, students and external stakeholders (see table 2). A total of 223 people were interviewed or took part in group discussions. In addition, 203 respondents filled out structured questionnaires with statements on their own institution (see appendix two and three). A 5-points Likert scale has been used for all the statements, with one indicating total disagreement, and five indicating total agreement with the statement presented.

Table 2: Number of respondents per university

	Number of interviews and FGD participants					Number of survey respondents				
	(Vice) Presidents	Staff	Students	External stakeholders	Total	(Vice) Presidents	Staff	Students	External stakeholders	Total
Adama University	3	6	12	8	29	3	6	8	8	**25**
Addis Ababa University	1	7	18	3	29	0	4	11	0	**15**
Aksum University	2	9	7	7	25	1	7	6	8	**22**
Dire Dawa University	3	9	9	9	30	3	9	9	9	**30**
Jimma University	3	10	9	6	28	2	10	9	6	**27**
Mizan-Tepi University	3	8	4	5	20	1	7	4	0	**12**
Unity University	1	6	5	1	13	3	9	10	2	**24**
Wollega University	3	9	9	6	27	3	9	9	6	**27**
Wollo University	3	6	9	4	22	2	6	9	4	**21**
	22	**70**	**82**	**49**	**223**	**18**	**67**	**75**	**43**	**203**

Source: authors

Staff and external stakeholders were purposefully selected based on their involvement in entrepreneurship education or business development, and students were selected who had taken an entrepreneurship course. A content analysis of the university' policy and educational documents was undertaken. With university leadership, semi-structured in-depth interviews were held on the strategy and organisational set-up of the university. With teaching staff and students, focus group discussions took place on entrepreneurial opportunities, entrepreneurship education, and research. A sample of external stakeholders (from the private and public sector) was drawn for in-depth interviews or focus group discussions on the role of the university vis-à-vis local and regional development.

Data of the interviews and focus groups were analysed in two steps. First, per university, data were summarised by using a data-matrix that related the information received with the variables of the European Commission/OECD framework. This resulted in a university specific narrative that was complimented by data of the various internal documents. As far as possible, the narratives represented a balanced picture from the perspective of all the four groups of respondents. Subsequently, the university-specific narratives were aggregated using the same variables of the European Commission/OECD framework with specific attention for the theoretically inspired factors for entrepreneurial transformation.

Findings

The empirical findings describe how the selected universities scored on the seven categories of the European Commission/OECD framework, present the gist of the content analyses, interviews and focus group discussions for each of these categories, and include information on the five factors of importance for entrepreneurial transformation of universities which are used in the discussion: strategic intent, leadership, funding, discretion, and engagement with society.

Perception scores

As a start, the importance of these seven categories according to all respondents are presented. The perception scores of all respondents are around the neutral value of 3.0 with no significant differences between top-management, teaching staff, students and external stakeholders. Table 3 presents the mean per category of the analytical framework of all the 203 respondents: the higher the value, the more positive respondents are about the entrepreneurial status of their university. The cumulative mean (all respondents, all seven categories) is 2.98, just below the neutral value of 3.0, indicating that respondents may have answered slightly more critical on statements related to the entrepreneurial status of their university. The means for the categories 'Leadership and Governance', 'Organisational Capacity', and 'Teaching and Learning' are above the neutral value of 3.0, indicating that respondents answered slightly more positively than negatively on statements related to

the entrepreneurial status of their university in these categories. The score for 'Impact measurement' is significant lower (2.50), indicating that respondents were of the opinion that limited monitoring and evaluation activities were in place.

Table 3: Mean on all seven categories and total Mean per university

	1. Leadership	2. Org. Capacity	3. Teaching	4. Support entrepren.	5. Exchange, Collabor.	6. Internatio.	7. Impact measure.	Total Mean
University 1	2,94	2,83	2,69	2,59	2,54	2,9	2,64	2,73
University 2	3,33	3,61	3,31	3,08	3,26	3,03	2,99	3,23
University 3	3,4	3,47	3,17	3,2	3,15	3,49	2,79	3,24
University 4	2,75	2,55	2,77	2,43	2,49	2,37	1,87	2,46
University 5	3,34	3,29	3,29	3,08	3,06	3,2	2,55	3,12
University 6	2,8	2,68	2,88	2,34	2,29	2,4	2,18	2,51
University 7	3,25	3,66	3,37	2,93	3,02	2,69	2,47	3,06
University 8	3,6	3,8	3,5	3,14	3,38	3,36	2,87	3,38
University 9	3,3	3,06	3,21	2,92	2,86	2,8	2,21	2,91
ALL 9	3,22	3,25	3,16	2,89	2,94	2,93	2,5	2,98

Source: authors

The survey results have been analysed exploring whether statistically significant differences exist between the universities. This is done by comparing the responses for the seven categories of the analytical framework per university. The comparison indicates that universities 2, 3 (a technical institute) and 8 score significantly higher than university 4 ($p = 0.009$, 0.003, and 0.000 respectively). Differences between universities 2, 3 and 8 and university 6 are also considerable, but only university 8 scores statistically significant higher than university 6 ($p = 0.010$).

Empirical findings per category of the European Commission/OECD framework[13]

Leadership and Governance

The concept of entrepreneurial university appeared to be new among leadership at the Ethiopian universities. No decisions had been taken towards stimulating the entrepreneurial status of respective institutions, and no data were available on the results of entrepreneurial activities. Absence of an entrepreneurial strategy went hand-in-hand with fragmented entrepreneurial activities that were at their infant stage. The most prominent strategic intent was on income generation, but hardly any relations were made between income generation activities, entrepreneurship awareness raising among students, entrepreneurship education courses, university – industry linkages, and community development. The situation at the

[13]See appendix eight for quotes from interviews and focus group discussions.

Institutes of Technology differed with strategic plans with a strong entrepreneurial focus, from the level of overarching strategic goals ('creating an entrepreneurial institute which incubates SMEs and creates jobs') up to the level of quantitative indicators. This corresponds with the higher perception score of university 3.

Although an increasing number of entrepreneurship development centres were being set-up as part of the government policy to form such a centre within each public university, there was neither a university-wide internal coordination of entrepreneurship development activities, nor a model for coordinating and integrating entrepreneurial activities at any of the universities. University-specific rules and regulations on entrepreneurship development were absent, or not comprehensive or not known.

The results of this study demonstrate however that a different orientation of top-management goes hand-in-hand with different level and type of entrepreneurial activities. The top-leadership of two universities were less committed to pursue an entrepreneurial agenda. At their universities, less entrepreneurial activities took place and the environment was less conducive for student business development. This corresponds with the information obtained from the survey with the lower scores for university 4 and 6. At two other universities top-leadership was very much engaged. This active commitment went hand-in-hand with a more open attitude and more support towards student and staff initiatives, new centres being set-up, and enterprise development. This corresponds with the higher scores for university 2 and 8.

Organisational capacity

The organisational capacity of the universities cannot be considered as entrepreneurial. Entrepreneurial behaviour is in most cases not formally rewarded, the institutional urge to seek additional income was almost absent, and rules, regulations, and procedures were not proven conducive in encouraging entrepreneurial attitudes of staff and students. Staff interviewed were of the opinion that the existence of considerable government involvement in the day to day operations of the university casted doubt on the autonomy of the university. University presidents were more positive in this respect.

The assessment also found that the existing working and learning environment on campus was not encouraging entrepreneurial attitudes of staff and students like risk taking, pro-activeness, and self-initiative. At many universities, the infrastructure was poor with for instance limited access to books, computers and internet. Toilet facilities for women were often problematic. In particular at the youngest universities, students and staff were frequently preoccupied with day to day issues, leaving little space for entertaining entrepreneurial activities.

Entrepreneurial Teaching and Learning

Regarding teaching and learning, the curricula assessed included limited attention for either entrepreneurship or entrepreneurial behaviour. It was believed by university management, staff and students that the few entrepreneurship courses offered were not suited for creating more entrepreneurial graduates. The majority of students approached the entrepreneurship course just as any other course they needed to pass in order to graduate. The entrepreneurship course was mainly offered as a supportive or common course, downplaying its importance. Examples were given of lecturers not coming to class, demonstrating no commitment. The need was widely expressed to strengthen the capacity of staff offering entrepreneurship education: most of the teaching staff lacked practical experiences and training on how to provide entrepreneurship education.

Preparing and Supporting Entrepreneurs

The limited activities across the board on entrepreneurship development, including support to entrepreneurs, are presented in table 2, differentiated by three subsequent phases of entrepreneurship development: 1) awareness creation; 2) strengthening entrepreneurial skills, attitudes and knowledge base; and 3) Business Development Support.

Table 4: Entrepreneurship Development within the nine universities assessed

	Formal education	Informal education	Facilities	Events	Financial support mechanisms[1]
Awareness creation	Supportive or Common Entrepreneurship course offered at all 9 universities in the final year of the BSc study, knowledge-focused	Employability & Entrepreneurship Orientation program at the end of BSc study, 2 to 5 days, at all 8 public universities	Entrepreneurship Development Centres or incubators being set-up at 6 public universities, not yet operational	Inspiration day at Addis Ababa University; Entrepreneurship Week & Entrepreneurship Olympiad at Dire Dawa University	Not applicable
Strengthening entrepreneurial skills, attitudes and knowledge base	Supportive or Common Entrepreneurship course offered at all 9 universities in the final year of the BSc study, knowledge-focused	Not offered	Entrepreneurship Development Centres or incubators being set-up at 6 public universities, not yet operational	Not offered	Not applicable
Business development support	Not offered	Not offered except ad-hoc support at 2 public universities to (female) student groups for setting-up petty businesses on campus (Aksum and Wollega University)	Entrepreneurship Development Centres or incubators being set-up at 6 public universities, not yet operational	Annual Expo at Addis Ababa Institute of Technology	Guarantee, start-up capital & cheap facilities for on-campus petty businesses at Aksum and Jimma University; Revolving fund for female graduate entrepreneurs at Wollega University

Source: authors

[1] Like grants, joint venture funding, special loan arrangements, public/private seed capital

Knowledge Exchange and Collaboration

The assessment resulted in a mixed picture of the level in which universities were collaborating with external stakeholders. Older universities had partnership agreements with international and local organisations, of which the majority were educational institutions, whilst younger universities had hardly any formal, operational partnerships. Active involvement of external experts in education and research can be neglected. Relations were mainly with (semi) governmental institutions, partially explained by the limited availability of registered businesses in Ethiopia.

Internationalisation

The study indicates that Ethiopian universities were starting to become more involved in international networks, in first instance mainly through donor funded projects. Older universities had more international activities than the younger universities who were less connected internationally. At all public universities, internationalisation was embedded in the strategic plans as important pillar for academic improvement and funding. A large proportion of Ethiopian scholars were pursuing their MSc or PhD abroad, building-up an international network. Student exchange programs of Ethiopian students going abroad were hardly in place.

Impact measurement

At the time of study, no data were available on the results of entrepreneurial activities. Neither a monitoring and evaluation system was in place. Some universities were planning to develop tracer studies and impact measurements of business awareness programmes. These findings are in line with the significant low perception score for 'Impact measurement' in the survey (2.49).

Discussion

The assessment using the European Commission/OECD framework indicates that the universities had limited policies, instruments and activities in place in support of a more entrepreneurial institution. Ethiopian universities cannot be labelled as being entrepreneurial. Also according to the definition of Gibb (2013) the same can be concluded: limited attention is given to empowering staff and students to demonstrate enterprise, innovation and creativity. And although all public universities were active in community outreach, thus creating public value, knowledge exchange and collaboration with external stakeholders was weak, in particular with private sector.

Beyond the fact that attention for entrepreneurship development was a new phenomenon at the Ethiopian universities, essential factors for entrepreneurial transformation were absent or weak at all the universities. These factors are strategic intent, funding, engagement

with society, discretion, and entrepreneurial leadership (Clark, 1998, 2004; Etzkowitz, 2004; Vorly and Nelles, 2009; European Commission and OECD, 2012; Gibb, 2012, 2013; Coyle *et al.*, 2013; Foss and Gibson, 2015; Etzkowitz *et al.*, 2017).

First, an entrepreneurial strategic intent as essential driver of a long-term transformation process was absent in the higher education sector and has not been taken into account when the still young universities were established. Strategies of young, recently founded universities were copies of older universities. The universities were not designed to encourage and support individual entrepreneurial behaviour. Relevant in this context is that the Ethiopian higher education sector is strongly central government-led, with the government expecting universities to comply with its national priorities and political goals (Amare, 2008). The government defines the strategic parameters for all the public universities. It has a strong say in curriculum development, controls the admission of students in view of fostering equity and access in all the regions of the country, and is responsible for the salary structure and labour conditions of the employees.

Secondly, a financial imperative to become more entrepreneurial was absent, with the public universities almost fully funded by the central government. Recent information indicated a change because the government starting to allocate budget for the foundation of 11 new universities. As a consequence, the government set income targets to the other universities. The implications of this policy development did not yet result in an entrepreneurial development at the universities. The private university studied could rely on the investments of the owner and on regular income out of tuition fees.

Third, engagement with society, in particular with the private sector, was limited. Generally speaking, the further away from capital, the less companies exist. Also (semi) government institutes are weaker than in the capital. The younger universities, most of them operating in regions far from the economic and administrative centre of the country, are often the strongest institutions in their region. External parties were not stimulating universities to act entrepreneurially: no experience nor structure were found that foster knowledge exchange and innovation.

Fourth, autonomy at individual and organisational level was limited. The universities are operating in a top-down, central governmental led development that is not enabling entrepreneurial behaviour at the level of the individual institutions. The educational system as well as university regulations are not conducive for agility, which is an essential element of entrepreneurial behaviour. This is confirmed by Habtamu (2016) in his study on Addis Ababa University when he refers to the constrained autonomy due to political interference by the Ministry of Education.

The fifth factor is leadership of key players in the university. In the top-down education and organisation system of Ethiopia, the exemplary role of the university president seems to be crucial. This study demonstrates that a different orientation of top-management goes hand-in-hand with different level and type of entrepreneurial activities. This coincides with the importance of leadership as one of the crucial dimensions that shape the entrepreneurial agendas of universities (Vorley and Nelles, 2009; European Commission and OECD, 2012; Coyle *et al.*, 2013; Gibb, 2013). And even more, it confirms the conclusion of Foss and Gibson of the importance of the interplay between exceptional leaders and a push for change derived from the university context (2015, p. 254). It can therefore be argued that the lever for an entrepreneurial turn at Ethiopian universities is the attitude and orientation of the institutional leadership.

Beyond these factors, there is another reason hampering entrepreneurial transformation. The European Commission/OECD framework assumes that basic conditions for teaching, learning and research are in place at a university as a basis for an entrepreneurial transformation process. In particular at the new universities this assumption is not being met. Basic living and working conditions are poor, harassment and insecurity are serious issues affecting all women in all universities (Eerdewijk, Wong, Bekele, Asfaw and Hailemariam, 2015), and learning materials, including computers, are scarce.

Last, the findings indicate that some entrepreneurial activities are starting up, but 'performing entrepreneurial activities does not automatically transform a university into an entrepreneurial university' (Sam and Sijde, 2014). They rightly state that one can only speak of an entrepreneurial university when 'the entrepreneurial activities create added value for education and research and vice versa'.

Concluding, the limited discretion in combination with the lack of an entrepreneurial vision, mission, and strategy, the limited knowledge exchange with external stakeholders, and the non-conducive basic conditions makes that the Ethiopian universities studied are not 'biased in favor of change' (Clark, 1998, p. 148). Or, differently stated, miss the 'integrated entrepreneurial culture' (Clark, 1998). This situation is not conducive for making students more entrepreneurial (Röpke, 1998). It can thus be questioned whether the universities are an effective nursery for young, entrepreneurial Ethiopians that contribute to innovation, employment creation and economic growth.

Marginal differences among universities

Significant differences were expected at forehand between universities, dependent on their age, size, academic profile, funding base, and location. However, differences were limited. Distance to the capital, as proxy of availability to industry, appeared not to be relevant with the university furthest away being one of the universities with the highest scores. The older

institutions in the sample have a more experienced faculty with more PhD holders, and a larger network. This study gave no indications that these differences matter significantly for the entrepreneurial status compared to the younger universities.

The qualitative findings indicate limited differences between the approach and offerings in formal and informal entrepreneurship education, neither between private and public universities, nor between younger and older universities. This may be explained because curriculum development in Ethiopia is highly centralised by the Ministry of Education. In addition, young universities often lack the competence to design new programmes, thus as a consequence adopt existing courses from older universities (Amare, Desta, Abera, Gebru and Kiros, 2015). A difference between the assessments of the private university in relation to the public universities was expected but not reflected in the results, neither the qualitative findings nor the survey results. Although private universities are more flexible than public universities in generating income and managing their respective institutions, the assessment did not find any real differences in respect to the level and kind of entrepreneurial activities.

A recent study of ten universities in the USA and Europe came to a similar conclusion, indicating that clustering of universities around size and age is not useful for describing entrepreneurial differences (Foss and Gibson, 2015). They indicate that what matters however is the regional and national context. It can thus be argued that the limited differences among the Ethiopian universities are because of the strong say of the government in university operations as explained above, creating a level playing field for all the higher education institutions with limited autonomy.

Concerning the priority for science and technology, it is often assumed that engineering departments are more and earlier entrepreneurial than others (Clark, 1998). This is confirmed in this study showing that an institutional entrepreneurial transformation process is – in its first stage – present in the technical institutes studied with their explicit entrepreneurial strategy and work programmes.

Conclusions

The results of this study have relevance for the higher education community in terms of understanding the complexity of transforming institutions into more entrepreneurial organisations in a low income country. To the best of the authors' knowledge, there is not any previous study that examines entrepreneurial characteristics of several universities in Ethiopia. Given the total number of public universities in Ethiopia (33 in 2015) in relation to the number in the study (eight, or 24 per cent) and given the central government-led developments in the education sector, the authors argue that the results of the study can be generalised to all the Ethiopian public universities.

The European Commission/OECD framework is useful for assessing the entrepreneurial status of higher education institutions in a holistic manner, also in developing countries. Researchers need however to be aware that the assessment framework assumes that a university is conducive for teaching, learning and research. In particular at younger universities in more remote areas in developing countries, these conditions may not be in place.

Last, limited information is still available on how regional and national contexts impact on the entrepreneurial status of a higher education institution (Foss and Gibson, 2015). Further research should look into differences and similarities between universities operating in more or less government-led contexts and between universities in high, middle and low income countries.


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Chapter 4

Universities in the complex setting of the West Bank: entrepreneurial or engaged?[14]

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Abstract

Palestinian universities lack resources, have restrictive (inter)national mobility opportunities, and are faced with numerous security measures. This chapter analyses to what extent entrepreneurial transformation at these universities is taking place and how it is related with the political, economic and cultural complex setting in which they operate. It combines a literature review with findings of a mixed methods study at four universities applying the entrepreneurial university framework of the European Commission/ OECD. Findings indicate that staff and students are more negative than positive about the entrepreneurial status of their institutions, with students being more critical than staff. At each of the universities, international donor supported entrepreneurial activities are starting up as a way to overcome youth unemployment. It is concluded that Palestinian universities are to be understood as engaged universities that increasingly stimulate their students to act entrepreneurially. Rooted in the context of the Palestinian cause, they contribute socially and culturally to their local communities. Furthermore, it is stated that in a developing context the notion of an entrepreneurial university as an important contributor to innovation through research does not apply. It is recommended to rethink the innovation-driven Triple Helix concept when applied in low-income countries, with 'donor-pushed' and 'society-driven' as new typologies for stakeholder cooperation.

Introduction

Palestine, formally known as the Occupied Palestinian Territories (OPT), is operating in a context of political tension, affecting the social and economic lives of its citizens. More than fifty years of Israeli occupation has led to economic stagnation, disrupting labour and trade flows, and constraining private sector development (CIA, 2017; UNCTAD, 2017). The economy is not sustainable, largely dependent on donor funding, and not competitive, ranking 107 of 148 countries according to the Competitive Industrial Performance Index (UNIDO, 2017; World Bank, 2017b).

The Palestinian labour force is characterised by high unemployment, large differences between men and women, a large informal economy, and many people outside the formal labour force. In this challenging context, the attention for entrepreneurship is growing rapidly. Palestinian universities are starting to offer entrepreneurship education to develop the entrepreneurial mindset of graduates, and are encouraging students to become self-employed. Making students more entrepreneurial asks also for an entrepreneurial university (Röpke, 1998), but how are Palestinian universities coping with this role in a context of scarce resources, when freedom of action and movement is restricted, and economic prospects are gloomy?

This case study analyses to what extent entrepreneurial transformation of universities in the West Bank is taking place and how this relates with the political, economic and cultural complex setting in which these universities operate. It is inspired by a mixed methods study at four universities from a total of 14 higher education institutions on the West Bank (see table 1).

Table 1: General profile of the four universities assessed

Name	Your of foundation	Total number of students (2017)	Total number of academic staff (2017)	Academic profile	Formal status
An-Najah National University (ANNU)	1977 (1918)	20.452	1.080	Comprehensive	Private
Al-Quds University (AQU)	1984	11.982	470	Comprehensive	Private
Hebron University (HU)	1971	8.700	390	Comprehensive	Public
Palestine Technical University Kadoorie (PTUK)	2007 (1930)	7.091	238	Technical	Governmental

Source: websites of the respective institutes and strategy documents, consulted in 2017

In this chapter, the HEInnovate assessment framework for European entrepreneurial higher education institutions (European Commission and OECD, 2013) is applied and Gibb's definition of Entrepreneurial Universities has been used (2013: 1). This definition refers to

an academic organisation that is designed for staff and students to 'demonstrate enterprise, innovation and creativity', that creates public value, partners with local, regional, national and international stakeholders, and that is able to effectively operate in a dynamic context. The concept of entrepreneurial university is however challenged by ideas of the 'engaged university'. These are universities that are dedicated to achieving social and cultural local impact (ACEEU, 2016b). This poses the question whether universities in Palestine can best be characterised as entrepreneurial or engaged.

The remainder of this chapter is structured as follows: first, the interrelations are explained between entrepreneurship education, entrepreneurial university and the economic context, and how the concept of entrepreneurial university differs to the concept of engaged university. The chapter continues by exploring the specific situation of the West Bank and the Palestinian higher education. In addition, the findings are structured around cases of four universities and ends with a discussion and conclusions.

Literature review

Substantiated by the importance of entrepreneurship for the employability of graduates and for economic development (Röpke, 1998; European Commission and OECD, 2014), universities globally pay increasing attention to entrepreneurship education. This education is seen as a way to develop the entrepreneurial mindset of students and to encourage them to become self-employed (Gibb, 2013). 'Entrepreneurship', and thus the associated competences and skills, is used in the dual meaning of being 'enterprising' as well as starting-up and running a business (Gibb, 2002; European Commission and OECD, 2014: 5).

Entrepreneurship education is just one element of an entrepreneurial university. Another feature of an entrepreneurial university is that it is designed to encourage and support individual entrepreneurial behaviour (Röpke, 1998; Clark, 2004; Coyle, Gibb and Haskins, 2013; Aranha and Garcia, 2014). Entrepreneurial activities are not in isolation from other university operations, but leadership, governance, education, research and community services are together geared towards achieving the entrepreneurial agenda of the institution (Gibb, 2013; European Commission and OECD, 2014). The entrepreneurial university concept goes beyond the stimulation of entrepreneurship, creation of business and commercialisation of knowledge, and of developing individual entrepreneurial competences and skills. It is geared towards achieving the strategic goals of the university (Gibb, Haskins and Robertson, 2009, updated 2012; Coyle, Gibb and Haskins, 2013). An entrepreneurial university is an academic organisation that is designed to 'demonstrate enterprise, innovation and creativity' of staff and students, that creates public value in partnership with local, regional, national and international stakeholders, and that is able to effectively operate in a dynamic context (Gibb, 2013: 1). A university needs to have a certain

level of autonomy to become entrepreneurial (Clark, 1998, 2004; European Commission and OECD, 2014). They are considered entrepreneurial when they are able to diversify their funding base by increasing non-public sources through commercialisation, in alignment with their academic operations (Clark, 2004).

In 2013, the European Commission and OECD developed an online self-assessment tool for European entrepreneurial higher education institutions named HEInnovate that operationalises the concept of entrepreneurial university on seven dimensions (2013)[15]. First, the university leadership and governance are stimulating and creating a stategic setting for entrepreneurial behaviour of its staff, students and external relations. Leadership is one of the important drivers of entrepreneurial transformation of universities (European Commission, 2012; Coyle *et al.*, 2013; Gibb, 2013). Second, the organisational capacities, in particular finance and human resources, are in place for implementing the entrepreneurial agenda of the university. Third, teaching and learning strengthens entrepreneurial mindsets of all students. Fourth, the university has a programme in place for preparing and supporting those students, staff and alumni that want to start-up a business. Fifth, the university strategically cooperates and exchanges knowledge with a diversity of stakeholders for the benefit of social, cultural and economic development. Sixth, the university has an active internationalisation policy of staff and student mobility, international research and partnerships. And seventh, the university is a learning organisation that uses the results of its entrepreneurial strategy and activities for continuous improvements. The disinction in the HEInnovate framework between 'entrepeneurial teaching and learning' and 'preparing and supporting entrepreneurs' aligns with the earlier mentioned difference between entrepreneurship in the meaning of being enterprising and of creating a business venture.

The origin of the concept of entrepreneurial university is understood in the context of knowledge-based economies with the seminal work in the late nineties by Etzkowitz in the United States of America and Clark in Europe (Clark, 1998; Etzkowitz, Webster, Gebhardt and Cantisano Terra, 2000). Universities are challenged to deliver relevance in research and teaching in a setting of growing global competition in the knowledge economy (Coyle *et al.*, 2013). They are seen as important drivers for economic growth and innovation (Fayolle and Redford, 2014).

Etzkowitz (2004) poses that the interaction with industry is the real lever towards becoming an entrepreneurial university. A strong 'interdependence' with industry and government, is a key phenomenon of entrepreneurial universities (Etzkowitz, 2004; Clark, 2004). Private sector, government and academia together shape the economy. Such a Triple Helix can

[15] In 2018, an 8th dimension has been added: 'Digital Transformation and Capability' (https://heinnovate.eu).

be university-pushed, government-pulled or corporation-led (Etzkowitz and Zhou, 2007). In the university-pushed model, universities are initiators of regional innovation through commercialisation of knowledge and job generators. In the government-pulled model, government is the most important actor and initiator of economic development. In this model, universities are under the control of government and supportive to regional development by helping existing industries and contributing to policy. The corporation-led model supposes industry to be the driving force of technological innovation with universities contributing to innovation.

Critics of the Triple Helix model argue that more stakeholders play a significant role in innovation and shaping the economy, in particular civil society. Civil society is important from the perspective that the public uses and applies knowledge and as such is part of the innovation system (Carayannis and Campbell, 2012). In developing countries, international donor agencies contribute as well. They support financially, and offer expertise and an international perspective (Beugré, 2017). This leads to quadruple or even quintuple helix models. This broader societal view aligns with a shift from a narrow focus on university's economic functions to its broader social and cultural roles (Cai and Lui, 2016).

The concept of entrepreneurial university with its emphasis on the business and economic dimension of higher education is challenged by ideas of the civic or engaged university. Goddard and Kempton (2016) characterise a civic university as an institution in which the structure, education and research are intertwined with the socio-economic development of the society in which they operate. Whilst research is designed for 'socio-economic impact', education is meant to 'produc[es] well rounded citizens as graduates' (2016, 13). With the main characteristic of civic universities being engaged with the community, the terminology of engaged or civic universities is interchangeable. The Accreditation Council for Entrepreneurial and Engaged Universities (ACEEU, 2016b) describes engaged universities being dedicated to 'continuous improvement and the generation of greater social and cultural impacts for the city and region'. Related to these concepts, and relevant for assessing the Palestinian universities is the concept of 'anchor' institution defined by the Work Foundation (2010: 3):

> *Anchor institutions do not have a democratic mandate and their primary missions do not involve regeneration or local economic development. Nonetheless their scale, local rootedness and community links are such that they are acknowledged to play a key role in local development and economic growth, representing the 'sticky capital' around which economic growth strategies can be built.*

Goddard, Coombes, Kempton and Vallance (2014) indicate that in particular in weaker economies, like in Palestine, universities are among the most important anchor institutions.

They can 'act as a source of stability in local economies, buffering against the worst effects of periodic downturns' (Goddard and Kempton, 2016: 7).

The above poses the question how universities in Palestine can best be characterised, operating in a setting of economic stagnation and occupation: are they entrepreneurial or engaged? What can we learn from understanding university transformation processes in other economically vulnerable societies?

Employment and entrepreneurship in the West Bank

Palestine is considered to be a factor-driven economy, characterised by high rates of agricultural self-employment and a large number of small manufacturing and service firms (Porter, 1990; Porter, Sachs and McArthur, 2002). However, due to the occupation, access to natural resources and upscaling through export is severely hampered. UNCTAD (2017) concludes that fifty years of occupation have resulted in 'de-development' of the Palestinian economy and undermining of the agricultural and industrial sectors. In 2017, around 2.9 million people lived in the West Bank, of which an estimated 18 per cent lived below the poverty line (PCBS, 2017; CIA, 2017).

The Palestinian labour force is characterised by high unemployment, large differences between the sexes, a large informal sector, and many people outside the formal labour force (see table 2). More than 150,000 people in the West Bank are unemployed (PCBS, 2017), excluding those who have dropped out of the labour market and are no longer seeking employment. The situation among young people (aged 15 – 24) is worse. The youth unemployment rate is almost fifty per cent, and if young people are employed, informal employment is the norm: in 2015 only 5.1 per cent of employed youth had a formal job (ILO, 2016).

Table 2: Employment Indicators of the West Bank, Palestine

Population size	2.9 million	
Labour force	844.000	
Unemployment rate	women: 29.8%	men: 15.5%
Unemployment rate of graduates	25,20%	
Average of Unemployment Duration	women: 10.9 months	men: 3.7 months
Informal employment	women: 51.5%	men: 66.8%
Outside labour force	women: 82.3%	men: 27.3%

Source: Labour Force Survey 2016, Palestinian Central Bureau of Statistics

In this challenging context, the attention for entrepreneurship is growing rapidly in Palestine. The Global Entrepreneurship Monitor pictures however a problematic entrepreneurial situation, characterised by high numbers of business closures, relatively low activity rates, and a large proportion of necessity entrepreneurship: there are 67 necessity driven entrepreneurs for each 100 opportunity driven entrepreneurs (MAS, 2013). The overarching majority of businesses are small-scale enterprises with an average of four employees (UNIDO, 2014). In recent years, initiatives have been taken in support of entrepreneurship. Palestine has risen on the Doing Business Index (from 140th to 114th in the annual ranking of 190 economies) (World Bank, 2017), indicating a better regulatory environment for starting, running and dissolving a business.

Higher education in Palestine

The higher education sector in Palestine is relatively young with the first universities founded in the 1970s (European Commission, 2012). Whilst these universities were established to provide higher education to young Palestinians at a time where it was becoming increasingly difficult to study abroad, their foundation is understood within the Palestinian state-building strategy. The universities were meant to preserve the Palestinian identity and acted as cradle for political activists (Taraki, 2015). Only after the Oslo Accords of 1993, the Palestinian National Authority was established and became responsible for various sectors, including education. Since then, the number of higher education institutions has increased to 49, enrolling 213,000 students. All of them predominantly focus on education with the research function underdeveloped, dependent on external funding. No support mechanisms exist for researchers who would like to protect their Intellectual Property as a first step towards commercialisation. Universities are self-managed, autonomous institutions, supervised by the Ministry of Education (European Commission, 2012).

University operations are constrained by the occupation in several ways. Financially, because the under-resourced Palestinian National Authority structurally contributes less to higher education than budgeted, leaving the universities largely dependent on income out of tuition fees (European Commission, 2012), project funding and sponsoring. In addition, international students and staff exchange is hampered due to limitations in mobility. Carrying out technical research and equipping laboratories is difficult because the import of an extensive amount of dual-purpose goods is prohibited. These are goods that have a security risk according to Israel, because of a potential use for military purposes (Niksic, Eddin and Cali, 2014).

Little information is available on the entrepreneurial status of Palestinian universities. A study undertaken in 2015 by Morar at one university in the West Bank concluded that entrepreneurship development was in its early stage. In 2016, Palestinian students

assessed the entrepreneurial status of seven universities in the West Bank using the HEInnovate framework (European Commission and OECD, 2013). The results showed that the entrepreneurial status of these universities was weak. They concluded that there is no clear entrepreneurial university model across Palestinian universities. Furthermore, publications from the European Commission (2012) and Khatib, Tsipouri, Bassiakos and Hajdaoud (2013) indicate that cooperation between the private sector and higher education is limited. Companies are hardly involved in curriculum development and higher education's contribution to innovation by businesses is minimal.

Methodology

This chapter is inspired by a mixed methods study at four universities from a population of 14 higher education institutions in the West Bank (see table 1). The entrepreneurial university framework HEInnovate of the European Commission/OECD is applied with its seven dimensions already mentioned (2013). The framework has been operationalised by identifying per dimension a set of variables and indicators (table 3). The study combined structured questionnaires allowing for a quantitative inter-university comparison, with interviews and content analysis to explore the phenomenon of 'entrepreneurial university' within each university-specific context.

Table 3: Variables per dimension of the HEInnovate framework

Dimension of framework	Variables
Leadership and Governance	Strategy; High level commitment; Coordination; Support to faculties; Relation to wider regional, social and community environment
Organizational capacity	Funding; Internal cooperation; Recruitment; Staff development; Incentives and rewards
Teaching and Learning	Formal learning; Informal learning; Validation of entrepreneurship learning outcomes; Collaborating and engaging with external stakeholders; Research
Supporting Entrepreneurs	Attention for entrepreneurship awareness; Business creation support; Business start-up training; Mentoring; Access to finance; Access to business incubation facilities
Knowledge Exchange	Collaboration and knowledge exchange with industry, society and the public sector; Active involvement in partnerships; Links with incubators, science parks and other external initiatives; Staff and students opportunities to take part in innovative activities; Knowledge exploitation
Internationalization	Internationalization strategy; International mobility of staff and students; International staff; Internationalization in teaching; International research
Monitoring and Evaluation	Impact of entrepreneurial strategy, personnel and resources, teaching and learning, start-up support, knowledge exchange activities, and internationalization

Source: adapted from HEInnovate, 2013

Per university, data were collected from four groups of respondents: leadership, academic staff, students and external stakeholders (see table 4). In total, 200 Students filled out a structured questionnaire with statements on their own institution, and 56 staff members filled out a similar questionnaire (see appendix two and three). Each dimension of the European Commission/OECD framework was captured in a sub-set of statements. A 5-points

Likert scale was used for all the statements, with one indicating total disagreement, and five indicating total agreement with the statement presented. The two questionnaires (for students and staff) were tested for validity and reliability using factor analysis. Each sub-set of statements had its own validity score[16], because it is based on a different dimension of the European Commission/OECD framework. All scores - Cronbach's Alpha – were 0.7 or far above, indicating that the factors are reliably measured by the relevant questions in the questionnaire.

In addition, 125 people were interviewed or took part in focus group discussions (FGD). Interview and focus group data were analysed in two steps. First, per university, data were summarised by using a data-matrix that related the information received with the dimensions of the European Commission/OECD framework. This resulted in a university specific narrative that was complimented by data of the various internal documents, allowing for triangulation and interpretation of the survey results. The narratives represented a balanced picture from the perspective of all four groups of respondents. Subsequently, the university-specific narratives were aggregated using the same dimensions of the European Commission/OECD framework.

Table 4: Number of respondents per university

	ANNU	AQU	HU	PTUK
Number of staff respondents	0	23	6	27
Number of student respondents	56	62	55	27
Number of interviews with staff and leadership	13	9	10	11
Number of FGDs with staff	1 (4 staff members)	0	0	1 (5 staff members)
Number of FDGs with students	2 (6+17 students)	2 (8+6 students)	1 (6 students)	1 (20 students)
Number of interviews with external stakeholders	3	1	5	1

Source: author

Findings

The empirical findings describe how the four Palestinian universities scored on the seven dimensions of the European Commission/OECD framework, include a narrative of each of the universities, and conclude with a summary.

Perception scores

Students and staff have been asked to score statements related to the entrepreneurial status of their university on a scale from one to five. Table 5 presents the means per dimension of the framework, i.e. the total scores of the respective sub-set of statements divided by the number of statements.

[16]See chapter 2, Methodology section, for the Cronbach Alpha scores.

Table 5: Mean per dimension of the analytical framework, students and staff, by university (n=256)

	ANNU	AQU		HU		PTUK	
	Students (n=56)	Staff (n=23)	Students (n=62)	Staff (n=6)	Students (n=55)	Staff (n=27)	Students (n=27)
Leadership and Governance	2,37	3,18	2,51	2,83	2,61	3,40	3,19
Organizational capacity	2,46	3,12	2,54	3,05	2,72	3,37	3,11
Entrepreneurial Teaching and Learning	2,48	3,02	2,55	2,89	2,70	3,28	3,22
Preparing and Supporting Entrepreneurs	2,42	2,85	2,44	2,70	2,56	3,15	2,89
Knowledge Exchange and Collaboration	2,51	2,87	2,42	2,74	2,59	3,28	3,12
Internationalization	2,71	3,01	2,54	2,61	2,46	2,90	3,05
Measuring impact	2,58	2,59	2,30	2,42	2,50	2,88	3,23
Total Mean	2,50	2,95	2,47	2,75	2,59	3,18	3,12

Source: author

On a Likert scale of five, a mean of three is regarded as average. Only the cumulative responses of PTUK staff and students were slightly above this average (3.18 and 3.12 respectively), indicating that this is the only university at which the respondents had a slightly more positive than negative perception on the entrepreneurial status of their university. Additional analysis of variance indicated that there are statistically significant differences between students and staff. Students scored significantly lower than staff on all of the seven categories of the framework with the exception of the category 'Measuring of Impact'. That category does not show significant differences. A closer look at the student responses leads to the conclusion that there are no statistically significant differences between students by department, by sex, or by number of years studying at the university. The same applies to staff. Hence, there are very small differences between how groups of respondents perceived the entrepreneurial status of their university with two exceptions: PTUK respondents and students.

An-Najah National University: for the sake of academic excellence[17]

At the time of data collection, the mission of An-Najah National University (ANNU) was different from the mission of other Palestinian universities. It put emphasis on scientific excellence in education and research with an international outlook. University leadership stressed that ANNU was focusing on being an academically strong institution and was proud of the quality of its students, stating that ANNU attracted the best high school students. The university ranked first or second among all Palestinian universities with respect to the quality of its programmes and several of its programmes were internationally accredited.

During the last few years, entrepreneurship started to get greater attention. Teachers increasingly challenged students to develop their own projects instead of relying on finding a job. In addition, the university website gave prominent attention to entrepreneurship. It stated that *'An-Najah aims at pushing the wagon of the Palestinian economy onward,*

[17]See appendix eight for quotes from interviews and focus group discussions.

therefore; it builds ties with the local community through carrying out pioneering projects and supporting entrepreneurs by offering them the needed resources and facilities' (ANNU, 2017). The university leadership realised that entrepreneurship activities at ANNU needed to be structured more: around ten units were working on entrepreneurship but there was no coordination.

However, both staff and students were critical. Staff indicated that the structure and culture of the university was not conducive for swift, entrepreneurial decision making. They considered ANNU as being bureaucratic and hierarchical with a lack of client orientation. According to students, ANNU was not focusing on entrepreneurship and they were not offered support (see table 5: the student mean was 2.50). They found it important to develop entrepreneurial skills, but indicated that if they wanted to develop in that area, they sought support outside the university. ANNU had no entrepreneurship awareness programme for students, hardly offered business development support, and attention for entrepreneurship in formal education was absent in many faculties or limited in others.

Some initiatives, however, focused on improving relations with industry. The Business Innovation and Partnership Center of the University (called NaBIC) was a kind of technology transfer office that maintained relations with industry. Furthermore, the Palestine Bank funded ANNU staff to spend one semester at a company. In this way, staff had the opportunity to enrich its practical experience and to feed this back into teaching. In addition, from the four universities studied, ANNU was the only one with several years of experience in running a business incubator. A local branch of an international IT company had its office within the premises of this incubator. Already in 2005, the Korean Palestinian Information Technology (IT) Institute of Excellence, which was hosted at the university, established the externally funded IT Incubator. Operating formally outside the university structure, the incubator was open for students, but not focusing on them. It operated in relative isolation from the regular university operations. In 2017, eight projects were incubated, none of them by students.

Al-Quds University: entrepreneurial out of necessity

The existence of Al-Quds University (AQU) is strongly related with the Palestinian cause. Naming the university Al Quds, the Arabic name for Jerusalem, is a statement in itself. At the time of the study, the university had a campus in the old centre of Jerusalem and was as such one of the few Palestinian organisations that could voice the interest of Palestinians within Israel. This came with a price: costly operations like the Jerusalem campus were kept open because of political reasons. Deteriorated by minimal governmental support, AQU structurally lacked financial resources. Out of necessity, the university had an active, entrepreneurial income generation strategy through developmental projects, sponsorships and above all being attractive to students. Around 70 per cent of the annual income was from tuition fees, and all the research was externally funded. On campus, many buildings were

named after wealthy individuals, mainly from the Middle East, who sponsored the facilities. Income out of spin-offs, business development services, or joint ventures was insignificant. Directly related to the need for income, was a positive attitude of the university administration towards staff seeking opportunities. Colleges were actively developing externally funded new initiatives. Staff indicated that the university had 'something entrepreneurial' because it was able to attract an increasing number of students although it was struggling in many ways (mainly financially). What was missing however was coordination and strategic mutual enforcement of the variety of these entrepreneurial initiatives.

The university recently paid more attention to increasing the employability of its graduates by linking education with industry, stimulated by the university strategy that focused on income generation, innovation, start-ups and job creation. The best example included the Dual Studies programme in Electrical Engineering and Information Technology that started in 2015 to maximise the possibility of graduates to get a job. These programmes were initiated by the German Institute for Development Cooperation (GIZ) that funded programmes to strengthen the employability of graduates. During the full Bachelor programme, students spent three months on campus, then three months at the company for which they got paid. In 2017, 80 companies were envisaged to be partners for more than 60 students. AQU considered the programme successful, because of the number of companies involved and employers were positive about graduates meeting their criteria. Stimulated by the success, a similar programme in international business started in 2016 and there were plans to use the same concept for Master level programmes.

In 2017, AQU started another novel initiative to reduce the gap between university and industry. It established a joint venture with a private company based in Dubai for the production and selling of personal care products made from Palestinian organic ingredients. This initiative derived from university research and production began in 2018. It was meant to become a place to train students with possibilities for employment.

However, students complained and were less positive about the entrepreneurial status of AQU (see table 5: the student mean was 2.47). They indicated that teaching was – with exceptions – theoretical with a focus on memorising. Entrepreneurial skills were not given attention. They stated that this was the general approach in Palestine, also at high school. There was no programme (curricular or extracurricular) offered to students for making them aware of the opportunities and challenges for becoming entrepreneur. There was no programme in place for supporting interested students to set-up a business. Support was given, but this was ad-hoc and dependent on individual faculty members. No student start-ups had been created.

AQU was actively engaged with many partners in society. Respondents stated that partnerships were important because they helped increase employability of graduates and could generate income. Another important reason for AQUs active partnerships was political: AQU operated in Jerusalem as one of the few Palestinian organisations whilst the Palestinian Authority could not. International partnerships were plenty; mainly project-based and externally funded, but international mobility of staff and students was limited due to travel restrictions. In 2017, three foreign students were able to get a visa to study at AQU.

Hebron University: a strategic, top-down entrepreneurial change

At the time of data collection, Hebron University (HU) was strongly embedded in the local community, literally in the centre of the city, and intertwined with the local social and cultural network. An example was the annual Hebron Grape Festival organised by the university in collaboration with the Municipality that promoted Palestinian agriculture. The city was in an economically vibrant region with many small, family-owned businesses and several companies, in particular in agribusiness. Founded in 1971 as an Islamic college, Hebron University was rooted in Palestinian Islamic traditions with an academic origin in culture and arts. This was appreciated by many Palestinian parents. They considered HU to be a trustworthy place for their daughters, in some departments there were more than 70 per cent female students. With around 9,000 students, it was a relatively small university.

In 2016, HU formulated a new, five-year strategic plan with the vision of becoming a global university by 2020. In his foreword, the university chairman explicitly referred to entrepreneurship as a way to increase employability of the graduates: *'Hebron University aims at offering all students a learning community (…) by integrating the culture of leadership and entrepreneurship in various disciplines of the university curricula in a market where job opportunities are becoming less while opportunities for entrepreneurship are increasing'* (Hebron University, 2017). To coordinate the implementation of this strategy, an entrepreneurship executive committee was established and chaired by the Vice President of Academic Affairs. As a first step, the university started to adapt the university bylaws, regulations, and policies with the aim of supporting the faculties to become more entrepreneurial. Next, a strategy for the entrepreneurial development of students was agreed upon. The university discovered that most of the graduates lacked the entrepreneurial skills needed for establishing new businesses or projects. Therefore, the university was planning to start developing the entrepreneurial mindset of students by offering short extracurricular training to 400 students. This was completely new for HU, because it had neither a programme nor stand-alone activities in place aiming at entrepreneurship awareness of students. This innovation process was stimulated and supported by a British Council funded project aimed at developing Palestinian graduates with entrepreneurial employability skills

and attributes. In this project, HU got support from three British universities in developing policies, pedagogical practices, and support structures for students.

Only recently, HU started to develop curricula on entrepreneurship in combination with capacity building of teaching staff. In September 2017, HU started to offer an elective course 'Entrepreneurship and Innovation'. At one faculty, the final research project of the Bachelor programme had been reoriented into a hands-on project in which students had to find a company and make a business plan. In 2017, 94 students participated. A bottleneck for introducing more entrepreneurial teaching was that the experience and skills were lacking on how to facilitate experiential and practical learning of students. Staff also mentioned that they got no support from the university to strengthen entrepreneurial skills of students. Undertaking practical work needed transport and budget, which was scarce.

Staff as well as students expressed the desire to have a business incubator at the university. This was also understood by the university leadership: an analysis of strengths and weaknesses of HU executed in 2016 indicated that the university did not have incubators to host innovative business projects and that there were no regulations for supporting start-up small and medium enterprises. No student start-ups had been created. Therefore, the Strategic Plan 2020 included actions to establish an IT Incubator and a Business Incubator. In addition, regulations were meant to be developed to support and implement innovative projects of students and staff. In addition, HU signed an agreement in 2017 with the Hebron House of Commerce to enable HU students to use their business incubator. This partnership also included a first business competition and business plan development training for students.

Although HU had many partnerships, institutional collaboration with companies seemed limited. Only recently, HU put more attention to cooperation with companies, mainly in the framework of projects funded by among others the World Bank and the Netherlands. The university-industry relations were mainly one-way partnerships in which the university asked for student support. Business representatives stated that they offered traineeships to students out of social responsibility. They found it important to decrease the gap between the graduate's skills and the company needs, but stressed that there were very little job opportunities. Collaborative research in support of innovative business was the exception to the rule.

Kadoorie: entrepreneurial leadership

Palestine Technical University Kadoorie (PTUK) became a university in 2007, but its origin dates back to 1930 as an agricultural college. In the twentieth century, PTUK lost access to most of its land and transformed into a technical college. At the time of this study, PTUK was

in a better financial position than other universities because the Palestinian Authority paid the salaries of all staff.

In 2013, a new university president came into office, actively pushing an innovation and entrepreneurship agenda. Known as one of the Palestinian leaders in innovative thinking and education development, he considered himself a change agent. Under his leadership, many new education programmes started. The student body increased with more than 60 per cent in five years to about 7,000 students. This growth was because of a rapid increase of the number of Bachelor students on top of a stable number of students in vocational engineering education. Deans expressed that there was a strong sense of cooperation among the management of PTUK because it was a new, upcoming university. They stated that 'we need to work as a team, otherwise it does not work'. There was a top-down coordinated strategy implementation with all deans involved. These developments seemed to pay off with staff and students perceiving PTUK as more entrepreneurial than how respondents from the other three universities perceived their universities (see table 5: staff scored 3.18 and students scored 3.12).

Under a new Innovation and Education Technology Center, in 2016, PTUK set in place a six months extra-curricular business ideation programme for students. At the end of this programme, students were presenting their ideas in front of potential investors. Typical for this programme – and similar Palestinian programmes – was the terminology: instead of naming it 'business ideas', students were stimulated to develop 'project ideas', being entrepreneurial (start-ups) or scientific (applied research). Staff and students referred to 'projects' instead of 'start-ups'. The core functionality of PTUK's programme was a database and online platform that allowed online support and evaluation of the ideas that students included in the database. By mid-2017, 148 students had included 47 projects in the database, of which 24 were entrepreneurial projects (40 students) and 23 scientific projects (108 students). At the time of this study, one project was about to receive funding from the Palestinian Higher Council for Innovation. In addition to the ideation programme, PTUK was starting up business incubation initiatives. An incubator was in place but with minimal activities. A second incubator focusing on agricultural start-ups, meant to open its doors in 2018, was made possible through external funding.

Recent initiatives had been introduced with the intention of making education more market-oriented. Supported by GIZ, the Fashion Design department trained students to be self-sufficient and worked 'extremely closely' with fashion industry. At the College of Technology, the vocational education programmes were practice-oriented and seven faculty members were trained to deliver the entrepreneurship course in an interactive, entrepreneurial manner. Students were however critical, stating that although individual teachers challenged

them to create their own projects, development of entrepreneurial skills was hardly given attention. They had limited understanding on what it would take to be an entrepreneur.

Relevant for all four universities was that they benefited from a recent Dutch funded project aimed to make their agricultural related education and research more demand-driven. A new, joint agribusiness Master programme was developed in close cooperation with Palestinian companies in which more emphasis was given to practical work.

Table 6: Summary of entrepreneurial university assessment of the four Palestinian universities

	ANNU	AQU	HU	PTUK
Leadership and Governance	Focusing on 'scientific excellence', no strategy towards becoming an entrepreneurial university	Strategy 'Creating a culture of Innovation and production', focusing on income generation, innovation, start-ups and job creation	In early stage of coordinated strategic change to become more entrepreneurial	Entrepreneurial vision and personal involvement of the University President
Organizational capacity	No income out of business development	An active entrepreneurial income generation strategy to overcome difficult financial situation; First attempt to raise income out of business development	Realization by university leadership that regulations and incentives need to be in place for staff to act entrepreneurially	Less focus on income generation because (relatively) better financial position
Teaching and Learning	Increasing number of entrepreneurship courses in several colleges, in particular Faculty of Engineering and IT	Purposefully introducing market-oriented experiential learning models; A few entrepreneurship courses	Introduction of new 'Entrepreneurship and Innovation' elective course	A few entrepreneurship courses, in particular at the College of Technology; Staff trained on entrepreneurship
Supporting Entrepreneurs	IT Incubator started in 2005; No entrepreneurship awareness and -development program for students	No entrepreneurship awareness and -development program for students; 2 incubators about to start	No entrepreneurship awareness and -development program for students	Business ideation program for students offered (RAE3); Incubator recently in place
Knowledge Exchange	Technology Transfer Office in place (NaBIC); Cooperation with companies as location for training and final graduation project	Companies contributing in Dual Studies program; Cooperation with companies as location for training and final graduation project	Cooperation with companies as location for training and final graduation project	Cooperation with companies as location for training and final graduation project
Internationalization	No double or joint degree programs with universities abroad; Mobility is scarce	Master study on Entrepreneurship in Fashion with Staffordshire University (UK) being developed; Mobility is scarce	Two double degree programs with universities abroad; Mobility is scarce	No double or joint degree programs with universities abroad; Mobility is scarce
Monitoring and Evaluation	No measurement of entrepreneurial performance	No measurement of entrepreneurial performance	Baseline study on students' entrepreneurial skills foreseen & repeat research to measure impact	No measurement of entrepreneurial performance

Source: author

Discussion

The cases demonstrate that the autonomy of the institutions allowed each university to make different choices with lack of funding and youth unemployment as imperatives for change. These choices varied from positioning the university as academically strong (ANNU), to being opportunity driven (AQU), a locally rooted teaching university (HU), to a technology driven innovative institution (PTUK). At each of the universities, entrepreneurial activities were starting-up mainly in the area of education. Entrepreneurship seemed to be presented as 'the' remedy for employment creation and economic growth, strongly promoted by the donor community. Entrepreneurship courses were set-up at all universities as well as incubators to help students to start-up their businesses. The four cases demonstrate that a diversity of initiatives were taken by the universities to develop entrepreneurial attributes of all students and linking education with industry. This is appropriate in the problematic economic context of Palestine.

From an 'entrepreneurial university' perspective, were the universities also designed to encourage and support individual entrepreneurial behaviour (Clark, 2004; Coyle *et al.*, 2013; Aranha and Garcia, 2014)? Did the universities systematically promote among their staff and students entrepreneurial attributes like opportunity identification and implementation? 'Performing entrepreneurial activities does not automatically transform a university into an entrepreneurial university' (Sam and Sijde, 2014: 901). They rightly state that one can only speak of an entrepreneurial university when 'the entrepreneurial activities create added value for education and research and vice versa'.

The question whether the Palestinian universities were designed to encourage and support individual entrepreneurial behaviour (Gibb, 2013) should be answered negatively. Nor are the Palestinian universities to be understood from the traditional, economically dominated view of entrepreneurial universities as contributors to innovation and business development with innovative research (Etzkowitz, 2004). The private sector in West Bank is small, university research is limited, and the economic outlook of Palestine is worrisome at the least. Only in the case of HU has a strategic entrepreneurial transformation process started. At PTUK, developments were going fast and ingredients were in place to become an entrepreneurial university, in particular the personal leadership of the university president who pushed an entrepreneurial agenda (European Commission and OECD, 2012; Coyle *et al.*, 2013; Gibb, 2013), and the academic technology base of the institute with its focus on innovation (Clark, 1998). At the other two universities, entrepreneurial activities were being undertaken but not as a coordinated, strategic intention. The case of AQU demonstrates that entrepreneurial strategic behaviour at most of the Palestinian universities was fuelled by financial necessity. Parallel to the high percentage of necessity entrepreneurs in the

country, entrepreneurial, opportunity seeking behaviour of university leadership and staff was also a choice out of necessity.

All new, entrepreneurial activities found at the universities were initiated by or at least fully compliant with international donor agencies supporting Palestine. Donors stimulated universities to cooperate more with industry. They pushed universities to be innovative in education in order to increase the chances for (self) employment of graduates. Thus, different from engagement with industry being the lever of change (Etzkowitz, 2004), entrepreneurial transformation of Palestinian universities was an external process initiated by donor agencies. The typology of Etzkowitz and Zhou (2007) on stakeholder cooperation of university-pushed, government-pushed, and corporation-pulled, needs 'donor-pushed' as additional typology explaining stakeholder cooperation in West Bank.

The donor dominance is reflected in the terminology used within the universities. Students, stimulated by the universities, stated that they intended to run their own 'project' after graduation. Staff and students did not refer to 'business' or 'start-ups'. They grasped the opportunities offered by donor project funding and as such demonstrated calculated, entrepreneurial behaviour feasible within the context of Palestine.

The question arises whether the concept of entrepreneurial university is suited for describing the Palestinian universities. Whilst the concept is intertwined with the role of universities in knowledge economies (Clark, 1998; Etzkowitz *et al.*, 2000), the Palestinian economy is factor-driven with predominantly small-scale enterprises and agricultural production. In this context, entrepreneurship is framed as developing entrepreneurial attributes of the youth. This is reflected in the focus of Palestinian universities on entrepreneurship education, more than on entrepreneurial university transformation.

The concept of 'anchor institution' (Work Foundation, 2010) does apply. The cases of the four universities indicate that they were locally rooted in the West Bank and played an important role in local development. They were responding to societal changes, acted as employers and sources of income for many, creating public value, and cooperating with a variety of stakeholders. As such, the Palestinian universities can be considered as engaged with structure, education and research intertwined with the socio-economic development of the West Bank (Goddard and Kempton, 2016). University strategy and leadership priorities – as important conditions for being entrepreneurial – need to be understood against the backcloth of the Palestinian cause. This fits within the strategy to 'resist by existence' captured in the Palestinian concept of 'sumud', which stands for a strong determination to stay in the country and on the land (Rijke and Teeffelen, 2014). The campus of AQU in Jerusalem is a case in point, which is kept open mainly for political reasons. Furthermore, the attention for student employability can be explained from the vision and mission of the

universities to build the capacities of the young people of Palestine for the benefit of the future of a Palestinian nation. Entrepreneurship education is brought in as a new instrument in this ongoing political, cultural and economic struggle.

Conclusions

Palestinian universities operate in a complex setting of a frustrated economy and an explosive political situation. They lack resources, have restrictive national and international mobility opportunities, and are faced with numerous security measures. Their prime focus is on education and they have limited research capacities and tradition. In this context, differences among the universities in West Bank are limited when assessing their entrepreneurial status. Stimulated by donor agencies, all are starting entrepreneurship activities for students with the ambition to help overcome youth unemployment. All try to improve working relations with industry, and all are struggling financially. Differences between the universities of how staff and students perceive the entrepreneurial status of their respective institutions are minimal. In general, one is more negative than positive, with students across the board being more critical than staff.

This leads to the conclusion that entrepreneurial activities are taking place at all universities, but more than being entrepreneurial, the Palestinian universities are to be understood as engaged universities that increasingly stimulate their students to act entrepreneurially. Rooted in the context of the Palestinian cause, they contribute socially and culturally to their local and regional communities (ACEEU, 2016b).

The theoretical implication from this paper is twofold. First, it carefully considers labelling a university ‘entrepreneurial’. Globally, all universities perform entrepreneurial or entrepreneurship development activities, but that does not yet make them strategically and organisationally entrepreneurial. Second, the notion of entrepreneurial university as an important contributor to innovation through research does not apply in a developing context with predominantly young teaching universities. This leads to the conclusion that the innovation-driven Triple Helix concept needs rethinking when applied in factor-driven economies. In a context in which government institutions are often weak, private sector is small, universities are young, under-resourced and focusing on teaching with weak research capabilities, ‘donor-pushed’ and ‘society-driven’ are useful typologies explaining stakeholder cooperation for economic development and innovation.


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Chapter 5

Entrepreneurial Universities and Nascent Entrepreneurs

Mudde, Huub L.M.

Abstract

This chapter draws on a qualitative multiple case study on skills and behaviour of university-educated entrepreneurs in Ethiopia and Indonesia. The study explored to what extent they attribute their entrepreneurial behaviour to characteristics of entrepreneurial universities or to human capital characteristics, i.e. social network (including entrepreneurial parents), work experience, and training. The findings indicate that there is relatively limited relation between entrepreneurial education and entrepreneurial behaviour of graduates, and partially confirm that nascent entrepreneurship starts several years after graduation and work experience. The chapter concludes that entrepreneurial universities seem to play a supportive and accelerating role, more than initiating latent and nascent entrepreneurship, through support by entrepreneurial teaching staff, mentoring, and by giving access to finance and alumni. It is argued that it is important to restrain from firm statements about the role of universities in start-up development as panacea of youth unemployment.

Introduction

An increasing number of universities globally strive to be entrepreneurial, specifically by engaging in and promoting business creation based on new knowledge. They promote business creation for a reason. Beyond the need to generate funding for their own purposes in the light of declining state subsidies, universities want to contribute to the economic development of their communities (Clark, 1998; Coyle, Gibb and Haskins, 2013). In countries with a large, young population, one way in which to promote such development is to provide for youth employment through entrepreneurship.

This desire is most often reflected in that university leaders, teachers, as well as government, state that it is important to produce an entrepreneurial mind-set among students, preparing them to become job creators. Making students more entrepreneurial however requires an entrepreneurial university (Röpke, 1998; Fayolle and Redford, 2014). An entrepreneurial university is more than a university that offers entrepreneurship education. It is purposefully designed for staff and students to 'demonstrate enterprise, innovation and creativity' (Gibb, 2013) through – besides entrepreneurship education - among others staff incentives, attracting non-public funding, facilities, mentoring, access to finance, incubators, and networking (European Commission and OECD, 2013).

But how successful are entrepreneurial universities? Can they substantiate their claim of contributing to more entrepreneurial graduates and to increased business activities by these graduates? Proof of the pudding is the existing university-educated entrepreneurs. What have made them start-up their business? In how far is the fact that they became businesspersons related to their education?

Although the body of literature on entrepreneurial universities has extended over the last decade, studies that measure the impact of entrepreneurial universities on entrepreneurial behaviour of its alumni are hard to find (Cai, Mudde, Reyes and Weng, 2017). Furthermore, literature on student entrepreneurs or university-educated entrepreneurs give little attention to (ir)relevance of the organisational context for starting a business (Wennberg, Wiklund and Wright, 2011; Bergmann, Hundt and Sternberg, 2016).

In order to address this research gap, a qualitative study was performed among university-educated entrepreneurs in Ethiopia and Indonesia. They were asked about their entrepreneurial skills, attitudes, knowledge, finance, facilities, and network, and how they have developed them. Ethiopia and Indonesia were chosen because of recent studies on entrepreneurial universities in these countries (Mudde, Tessema and Derese, 2015; Mudde, Primaswari and Fauzi, 2017). This makes it possible to relate the narratives of entrepreneurs to the status of entrepreneurial programmes at their universities[17].

This study builds on the notion that entrepreneurship can be learnt (Hessels, Brixy, Naudé and Gries, 2014) and is grounded in human capital theory. This theory explains that individuals with more knowledge, better skills, and more competencies will perform better (Martin, McNally and Kay, 2013).

The remainder of this chapter first reviews literature on entrepreneurship education and -behaviour, and describes the research methodology used. Next, it presents the findings and ends with a discussion, conclusions, and limitations of the study.

Literature review

Theories concerning entrepreneurial universities

Globally, there is an increasing number of universities that are or claim to be entrepreneurial. Many definitions exist of entrepreneurial universities (Guerrero, Kirby and Urbano, 2006) with a dominating view that it is an academic organisation in which staff and students are stimulated and enabled to 'demonstrate enterprise, innovation and creativity' (Gibb, 2013) in partnership with local, regional, national and international stakeholders (Clark, 1998; Etzkowitz, 2000; Gibb, 2013). At an entrepreneurial university, leadership, governance, education, research and community services are together geared towards achieving the entrepreneurial agenda of the institution (Gibb, 2013; European Commission and OECD, 2014). This is done through – besides entrepreneurship education - among others incentivising entrepreneurial behaviour of staff, attracting non-public funding, offering facilities, mentoring and access to finance, setting-up incubators, and networking (European Commission and OECD, 2013).

HEInnovate measures the entrepreneurial status of universities across eight dimensions (European Commission and OECD, 2013). First, university leadership and governance, which is about stimulating and creating a stategic setting for entrepreneurial behaviour of staff, students and external relations. Second, the organisational capacities, in particular finance and human resources, that are needed to implement the entrepreneurial agenda of the university. Third, teaching and learning for strenghtening entrepreneurial mindsets of all students. Fourth, preparing and supporting entrepreneurs, i.e. a programme for those students, staff and alumni that want to start-up a business, including giving access to facilities and finance. Fifth, knowledge exchange and collaboration with a diversity of stakeholders for the benefit of social, cultural and economic development. Sixth, internationalisation, which comprises of an active internationalisation policy of staff and student mobility, international research and partnerships. And seventh, measuring impact, being a learning

[17]Unfortunately, it was not possible to collect data of university-educated entrepreneurs in Palestine.

organisation that uses the results of its entrepreneurial strategy and activities for continuous improvements.

In 2018, HEInnovate added an eighth dimension, 'Digital Transformation and Capability'. It is based on the notion that an entrepreneurial university is able to make the most of the opportunities offered by digital technologies in support of innovation and entrepreneurship.

Human capital investment: education and experience

Entrepreneurial universities are diverse in all aspects but have in common that they all have an entrepreneurship education programme (Maritz, Koch and Schmidt, 2016). An entrepreneurship education programme is a 'pedagogical [programme] or process of education for entrepreneurial attitudes and skills' (Fayolle, Gailly and Lassas-Clerc, 2006: 702), aiming to increase entrepreneurial awareness among students and to prepare them in start-up a business. In other words, entrepreneurship education is meant to create latent entrepreneurs and to support nascent entrepreneurs in their attempts to start-up a business. Latent, or potential entrepreneurs are those individuals who would prefer self-employment but who are still engaged in wage employment (Atasoy, 2015) or are still studying. A nascent entrepreneur is defined by the Global Entrepreneurship Monitor (GEM) as a person who is actively taking steps to set up a new business, whilst existing entrepreneurs are those who recently started their business.

The reasoning behind entrepreneurship education is that entrepreneurship can be learnt (Lazear, 2004, 2005; Hessels, Brixy, Naudé and Gries, 2014). This notion is grounded in human capital theory that explains that individuals with more knowledge, better skills, and more competencies will perform better (Martin *et al.*, 2013). Van Praag and Van Stel (2013) pose that this is also the case for business owners: the best performing business owners – in the sense of income and growth – are those who have the highest level of human capital, in particular education (p336). In line with this theory is Lazear's (2005) position that entrepreneurs purposefully invested in their human capital through education and work experience. He argues that entrepreneurs are 'jack-of-all-trades' with a balanced skill set. They need to be sufficiently skilled in a broad set of areas in order to be able to set-up and run a viable business. Lazear concludes that more variation in education and in work experience will increase the chances of success in setting-up and running a business.

Several scholars have empirically tested Lazear's theory. Wagner (2006) in a study among a representative sample of the German population, confirms this theory. He concludes that the probability to become an entrepreneur of someone with more education and fields of experience is three times as high as for someone with less education and experience. Stuetzer, Obschonka and Schmitt-Rodermund (2013) are interested in the origin of the skill set of nascent entrepreneurs. They first confirm that a balanced skill set is indeed positively

associated with the progress of nascent entrepreneurship. Subsequently, they conclude that these skills originate from intentional investments by the entrepreneur (measured by early interest in an entrepreneurial career and prior managerial and entrepreneurial experience) as well as from unintentional personal development. They thus emphasise that "both planful investment and initial talent seem to be important" (p97) for a balanced skill set. In their study among entrepreneurs in Germany and the Netherlands, Hessels *et al.* (2014) support Lazear's view that a varied work experience and skill set are supportive to successfully starting-up a new business. Lechmann and Schnabel (2014) confirm that entrepreneurs indeed perform more tasks that need more skills than employees, but also conclude that the difference is small, in particular for the 'solo self-employed'. Both Hessels *et al.* as well as Lechmann and Schnabel find that entrepreneurs, beyond having a broad skill set as argued by Lazear, also benefit from specialisation through acquiring expert skills.

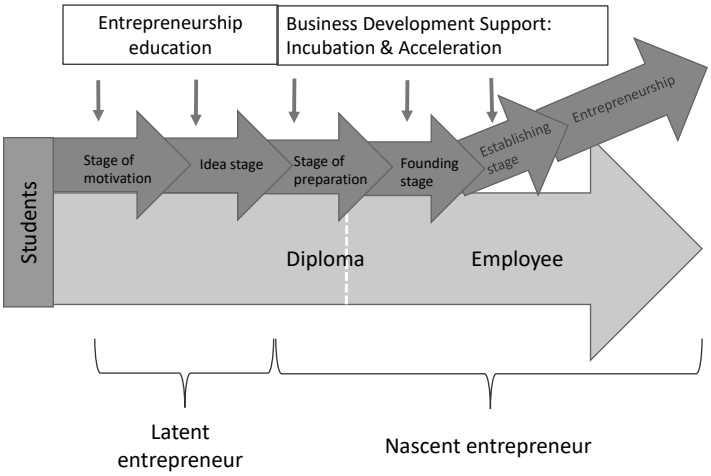
The notion of an entrepreneur to be multi-skilled is captured by Frank's (2007) comprehensive overview of learning outcomes that are considered to be important for an aspiring entrepreneur. She presents seven categories of individual entrepreneurial characteristics divided by attitudes, life styles, entrepreneurial values, competencies, relation management, and business and management understanding. Frank poses that for becoming an entrepreneur, a graduate needs to have a combination of knowledge, skills and the right attitude.

The importance of work experience prior to start-up a business is evidenced by several studies implying a time interval of several years between graduation and business creation (Wennberg *et al.*, 2011; European Commission and OECD, 2014; Rauch and Hulsink, 2015; Juha, 2017). Next to the need to foster a broad skill set, this can be explained because financial means first need to be generated, ideas to be ripened, and a business network to be matured. Younger entrepreneurs perceive more barriers than older entrepreneurs, in particular lack of experience, finance, skills, support, and market opportunities (Schoof, 2006; Brixiová, Ncube and Bicaba, 2015; Staniewskia and Awruk, 2015). This coincides with results of research indicating a correlation between age and business performance (Rai, 2008; Verdugo, 2018; Kirogo, Nyaboga, Marwa, Nyaanga and Waiguchu, 2018) showing that changes of a venture's success increase with experience.

The relation between education, work experience and business creation is depicted in figure 1 illustrating two models. Model A, the fast track entrepreneurship model illustrates business creation as a direct causal result of entrepreneurship education. This is the common model underlying entrepreneurship education at many universities. Entrepreneurship is taught to a sub-set of students, and support is given to start-up a business. Model B, the postponed entrepreneurship model, is getting more attention. During the education career, the focus is on motivating students to become entrepreneur and on strengthening their creativity as

a basis for idea generation. After several years of employment, some alumni may start-up a business as indirect result of their entrepreneurship education.

Model A: The fast track entrepreneurship model: business creation as a direct result of entrepreneurship education to a sub-set of students.



Model B: The postponed entrepreneurship model: business creation after some years of working experience, indirect result of entrepreneurship education

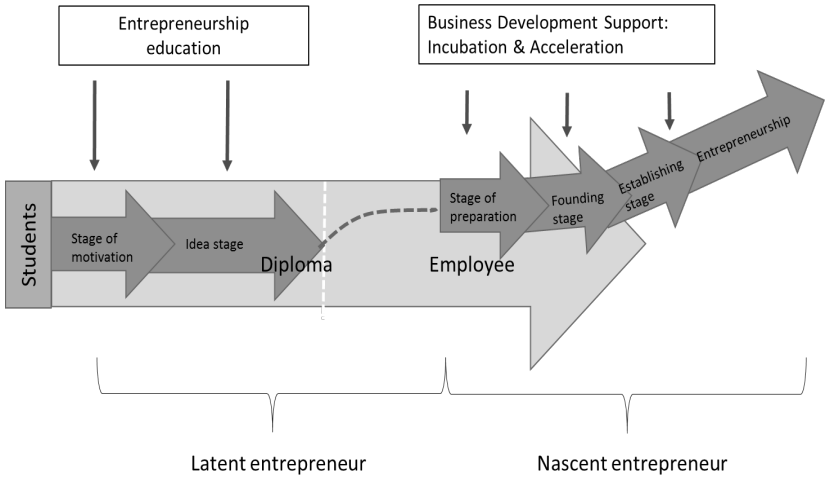


Figure 1: Entrepreneurship education and venture creation

Source: adapted from Maritz *et al.*, 2016

Individual characteristics

Beyond education and work experience, entrepreneurial parents are frequently mentioned as determinant of human capital of entrepreneurs. Gartner (1985) identified in his work on venture creation job satisfaction, previous work experience, entrepreneurial parents, age, and education as individual characteristics of entrepreneurs. Recent studies confirm that parents who are – or have been – entrepreneur serve as a role model (Rauch and Hulsink, 2015) and extend this to the importance of social networks. These networks comprise of various actors, like family, friends, members of a community, alumni, fellow entrepreneurs, but also teachers. Social networks can foster entrepreneurial intentions, can help discover and exploit business opportunities, can be beneficial to an entrepreneur by giving access to and reducing the costs of a variety of resources, but also can be constraining in the sense of social obligations (Egbert, 2009; Nieto and González-Alvarez, 2014; Fernández-Pérez, Alonso-Galicia, Rodríquez-Ariza and Fuentes-Fuentes, 2015; Tang, Chen, Baskaran and Tan, 2016; Slade, Kistruck and Zietsma, 2018).

In an extensive literature review, Simoes, Crespo and Moreira (2016) categorise individual factors that affect a decision to become nascent entrepreneur. Beyond human capital variables of skills, work experience and family background, they identify basic individual characteristics (among which gender and age), health, nationality and ethnicity, access to financial resources, and personality characteristics. The latter, frequently referred to as entrepreneurial attitudes or mind-sets, are widely studied. There is no consensus on what the personality characteristics are that affect the probability to become entrepreneur, but the three characteristics already mentioned by Gartner (1985) in his framework on venture creation are not disputed. These are need for achievement, locus of control, and risk taking propensity. The framework of entrepreneurship learning elements by Frank (2007) includes personality characteristics, next to skills. She categorises them as entrepreneurial attitude and characteristics, and as entrepreneurial values.

Entrepreneurship behaviour

A fundamental question is whether entrepreneurship education indeed leads to more entrepreneurial behaviour. Many studies have been carried out on the relation between entrepreneurship education and entrepreneurial behaviour (Van der Sluis, Van Praag and Vijverberg, 2008; Martin *et al.*, 2013; Rideout and Gray, 2013; Bae, Qian, Miao and Fiet, 2014; Rauch and Hulsink, 2015), indicating that the impact of education on the choice to become entrepreneur is limited. Rideout and Gray (2013) even conclude after reviewing several studies that they do not know whether entrepreneurship education really works. In a systematic review of 98 empirical studies, Van der Sluis *et al.* (2008) label the impact of education on becoming an entrepreneur as 'insignificant', but conclude as well that education has a positive effect on the performance of entrepreneurs. Performance is measured as income, growth and survival rate.

Based on the theory of planned behaviour from Ajzen (1991), intentions are used in many studies as predictor for engaging in a behaviour. Thus, the higher the entrepreneurial intention of a person, the higher the change that that person will perform entrepreneurial behaviour. Bae *et al.* (2014) tested the hypothesis that entrepreneurship education is positively associated with entrepreneurial intentions. They analysed 73 studies and first conclude that there is indeed a small, but significant relation between entrepreneurship education and entrepreneurial intentions. However, after taking into account pre-education entrepreneurial intentions, the correlation between entrepreneurship education and post-education entrepreneurial intentions was not significant. The education programmes analysed were aimed at entrepreneurial awareness raising. Martin *et al.* (2013) carried-out a similar meta-analysis of 42 independent studies and they conclude that entrepreneurship education has a positive impact on entrepreneurship interest and attitudes among students, and on their performance as entrepreneurs.

Another concept researched is entrepreneurial self-efficacy, which refers to the perceived ability to *'successfully perform the various roles and tasks of entrepreneurship'* (Bae *et al.*, 2014: 220). Entrepreneurial education may lead to a higher entrepreneurial self-efficacy, which in turn may lead to an increased entrepreneurial intention (Bae *et al.*, 2014). Gielnik, Uy, Funken and Bischoff (2017) draw a similar conclusion. In a longitudinal study with data of 227 students from a university in Kenya, they studied the short- and long-term effects of entrepreneurship training on entrepreneurial self-efficacy, passion, and business creation. They conclude that entrepreneurship training and business creation are indirectly positively related. They state that entrepreneurship training fosters entrepreneurial self-efficacy, that this self-efficacy is important for being passionate about starting a business, and that this passion may in the long-run actually lead to business creation.

In their study among students and graduates of a business school, Rauch and Hulsink (2015) conclude positively about the relation between entrepreneurship education and entrepreneurial behaviour. They find that education has affected attitudes, which in turn affected students' intentions. Interestingly, they demonstrate that these entrepreneurial intentions resulted 18 months later into entrepreneurial behaviour. The relation between entrepreneurship education and entrepreneurial intention can however also be negative, as concluded by Oosterbeek, Van Praag and IJsselstein (2010). They studied two groups of vocational education students in the Netherlands that followed a similar study, one group with an entrepreneurship education programme, and the other without. All students self-assessed their entrepreneurial skills and intentions before and after the study programme. The results indicate that impact of the entrepreneurship education on the skill set is insignificant and even negative on the students' intention to become entrepreneur. The authors argue that this may be because students got a more realistic view on what it would imply to be an entrepreneur.

Concluding, the pattern emerging from the extant body of literature is that entrepreneurship can be learnt, that there is a neutral or possibly slightly positive relation between entrepreneurship education and entrepreneurial behaviour of graduates, and that there is a time interval between graduation and becoming a nascent entrepreneur, endorsing the postponed entrepreneurship model as presented in figure 1. Less clear is the relation between entrepreneurial universities and business venturing. Studies that measure the impact of entrepreneurial universities on entrepreneurial behaviour of its alumni are hard to find (Cai, Mudde, Reyes and Weng, 2017) and literature on student entrepreneurs or university-educated entrepreneurs pay little attention to the role of the university context for starting a business (Wennberg, Wiklund and Wright, 2011; Bergmann, Hundt and Sternberg, 2016). Bergmann *et al.* conclude that organisational characteristics of the university play a role in students becoming nascent entrepreneurs. In their study, they however limit these characteristics to peer influence of fellow students that have attended entrepreneurship education. The question arises whether an entrepreneurial university, with its broad set of entrepreneurial characteristics – offering facilities, mentoring and access to finance, setting-up incubators and orchestrating networking, next to entrepreneurship education – not only substantially contributes to creating latent entrepreneurs but also leads to more graduates becoming nascent entrepreneurs. In other words, the research deficit this study wants to address is how entrepreneurial university characteristics relate to entrepreneurial behaviour of university graduates.

This study is about the individual perspective of venture creation by university-educated entrepreneurs, related to attitude, intention, skills set and competencies. Venture creation can however also be explained from other perspectives, i.e. the organisation, the environment and the process (Gartner, 1985). These perspectives are beyond the scope of this study.

Methodology

This chapter draws on an inductive, qualitative multiple case study on skills and behaviour of entrepreneurs in Ethiopia and Indonesia. These countries were chosen because of recent, related studies on entrepreneurial universities in these countries (Mudde *et al.*, 2015; Mudde *et al.*, 2017). This study wants to explore whether universities can substantiate their claim of contributing to more entrepreneurial graduates (latent entrepreneurs) and to increased business activities by these graduates (nascent entrepreneurs). It researched to what extent university-educated entrepreneurs attribute their entrepreneurial behaviour and individual entrepreneurial characteristics to characteristics of entrepreneurial universities or to human capital characteristics. The latter are: social network (including entrepreneurial parents), work experience, and education and training.

Data collection

The primary source of data was interviews. The interviews were semi-structured, conducted in a face-to-face manner guided by an interview protocol. Respondents were purposefully identified through personal connections within and beyond the universities prior assessed. The initial selection criteria were that the entrepreneur i) had recently finalised or was about to finalise at least a university Bachelor study, and ii) had an operational business for at least a year. The latter criterion was set to exclude non-viable and less serious business endeavours.

A total of 14 entrepreneurs were interviewed, see table 1 for the characteristics. In Ethiopia, finding entrepreneurs that had recently finalised a university degree appeared to be difficult, reflecting the only recently started attention for entrepreneurship at universities (Mudde *et al.*, 2015). University contacts resulted in two respondents, of which one was still studying. Five other respondents were found via the Ethiopia Entrepreneurship Development Centre. This is an organisation established to spearhead the development of entrepreneurship activities in the country. It provides entrepreneurship training programmes and business development support services. As a result, the respondents are heterogeneous with respect to university background, age, and years in business.

In Indonesia, getting access to respondents was easier. University staff with expertise in entrepreneurship facilitated contacts to alumni and some students that were about to graduate. The prime focus was on students and alumni of the Agricultural University Bogor (IPB), subject of prior research (Mudde *et al.*, 2017). As a result, the sample is more homogeneous with respect to university background, age, and years in business.

Table 1: Characteristics of respondents

	Country	University	Degree	Age	Sex	# years in business
1	ETH	Alkan Health Science College	BSc Public Health	35	M	1,5
2	ETH	Bahir Dar University	BSc Business Management	27	M	2
3	ETH	Gambella University	BSc Procurement & Supply Chain Management	38	M	10
4	ETH	Addis Ababa University	PhD Social Work	41	M	8
5	ETH	Bahir Dar University	BSc Economics	46	M	5
6	ETH	Addis Ababa University	BSc Engineering	21	M	Less than 1
7	ETH	Bahir Dar University	BSc Business Management	38	F	2
8	IDN	Udayana University	BSc Marketing	21	M	Less than 1
9	IDN	IPB	BSc Animal Science	22	M	1,5
10	IDN	IPB	BSc Agricultural Technology	26	M	3
11	IDN	IPB	BSc Management	28	M	5
12	IDN	IPB	BSc Animal Sciences	22	M	1
13	IDN	IPB	BSc Agricultural Technology	30	M	4
14	IDN	IPB	BSc Agribusiness	26	F	2

Source: author

Data analysis

The theoretical framework of analysing the narratives of the entrepreneurs is based on the HEInnovate framework of entrepreneurial universities (European Commission and OECD, 2013) and the entrepreneurship learning model of Frank (2007). The HEInnovate framework is chosen, because it has been used in the analyses of Ethiopian and Indonesian universities (Mudde *et al.*, 2015; Mudde *et al.*, 2017), allowing for triangulation of the narratives of the entrepreneurs with the narratives of the universities (Yin, 2014). The analysis included those characteristics of an entrepreneurial university that can be observed on the level of an individual entrepreneur, see table 2. That excludes two dimensions of HEInnovate, i.e. leadership and governance, and measuring impact. Also the most recent dimension, added in 2018 by HEInnovate (Digital Transformation and Capability), was not yet included.

Table 2: Characteristics of entrepreneurial universities included in this study

Dimension of HEInnovate	Explanation	Variables included in this study	Indicator(s)
Organizational capacity	Variables on funding, people and incentives. An important aspect is the degree to which entrepreneurial behavior of staff is incentivized.	Entrepreneurial staff	Availability of staff with entrepreneurial attitudes, behaviour and experience
Entrepreneurial Teaching and Learning	Variables stimulating an entrepreneurial mind-set in education, both through content as well as approach	Entrepreneurial teaching	Degree-based education stimulating an entrepreneurial mind-set Extra-curricular programmes stimulating an entrepreneurial mind-set Teaching methods stimulating an entrepreneurial mind-set Engaging of external stakeholders in education
Preparing and Supporting Entrepreneurs	Variables on what the university has in place for supporting those students, staff and alumni that want to start-up a business, including giving access to finance, networks, and incubation	Entrepreneurship support	Entrepreneurship awareness programmes Training Business creation support Mentoring Access to finance Access to incubators and other facilities
Knowledge Exchange and Collaboration	Variables on knowledge creation with and for the benefit of the social, cultural and economic development of society	Networking	Knowledge exchange and events with businesses, research institutes, government institutes, and NGOs
Internationalisation	Variables on staff and student mobility and the importance of international research and partnerships	International mobility	Staff and student international mobility International partnerships

Source: http://www.heinnovate.eu, accessed in 2013, 2014, 2015

Table 3. presents the individual entrepreneurial characteristics (entrepreneurship skills, attitudes, and knowledge) assessed in this study, categorised according to Frank's model of learning elements (2007). In addition, entrepreneurs were asked about how they initially had managed to acquire technical skills and finance, and got access to facilities and networks.

Table 3: Entrepreneurship skills, attitudes, and knowledge assessed

Entrepreneurship learning elements	Explanation	Variables included in this study	Indicator(s)
Entrepreneurial behaviour, attitude and characteristics	Skills that are considered to be relevant for entrepreneurial behaviour	Entrepreneurship skills	Opportunity seeking Initiative taking Willingness to take ownership Commitment to see things through Strong sense of autonomy Intuitive decision making with limited information Networking capacity Strategic thinking ability Negotiation capacity Selling/persuasive capacity Achievement orientation Willingness to take risks
Awareness of entrepreneurial life styles/approaches	Understanding what it may imply to be an entrepreneur for personal life	Entrepreneurship life style	Work under pressure Cope with loneliness, uncertainty and complexity Learning by doing, copying, making things up, problem solving Managing interdependencies Understanding benefits, disadvantages of entrepreneurship career vis-à-vis employee career Working flexibly, long hours
Minimum business know-how	Knowledge on business management and administration	Business management knowledge	Knowledge areas like business planning, accounting, marketing and sales, performance management, customer relations, financial management, HR
Understanding process (stages) of setting up an organisation	Knowledge on the total process of setting up an organisation from idea to survival	Business start-up understanding	Knowledge of how to set up a business

Source: Frank, 2007: 639-640

This leads to the following model underlying this study, conceptually relating entrepreneurial university characteristics and human capital characteristics with latent and nascent entrepreneurship.

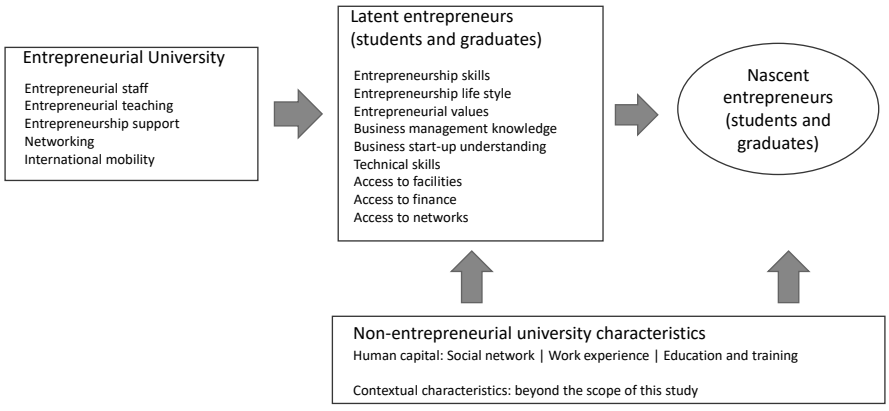


Figure 2: Conceptual framework

Source: author

Data of the interviews of the entrepreneurs were analysed in two steps. First, per entrepreneur, data were summarised by using a data-matrix that related the information received with the variables of the European Commission/OECD framework versus human capital characteristics. Interview quotes were minuted in the appropriate cells of a table with on the x-axis the entrepreneurial university variables (see table 2), human capital variables (social network, work experience, and education and training) and 'self-taught'. On the y-axis the variables of Frank (2007) as included in this study (see table 3) were listed plus technical skills, access to facilities, access to finance, and access to networks. Subsequently, the number of different variables mentioned were scored in a similar table per respondent, excluding repetitions in the narratives. Next, the entrepreneur-specific narratives and scoring tables were aggregated per country using the same formats. This resulted in cumulative scores for the seven respondents per country.

Entrepreneurial universities and entrepreneurship in Ethiopia and Indonesia

Recently, the higher education sector in Ethiopia is pushed to strengthen the ability of graduates to find employment by providing skills or preparing them for self-employment through entrepreneurship development. There is an increased interest for entrepreneurship education for undergraduate students, the establishment of entrepreneurship development centers, and initial support to student start-ups. Mudde et al. (2015) performed a mixed methods study at nine universities in Ethiopia. Findings indicate that entrepreneurial activities in Ethiopian universities are at their infant stage with limited differences among the universities (see for an overview of entrepreneurship education and – support offered by these universities table 4 of chapter three). They are operating in a top-down, central governmental-led development that is not enabling entrepreneurial behaviour at the level of the individual institutions.

In Indonesia, many higher education institutions are offering courses on and for entrepreneurship, stimulating graduates to become job creators instead of job seekers. Furthermore, several Indonesian ministries and government institutions are supporting the proliferation of new small and medium enterprises. Mudde et al. (2017) explored university entrepreneurial transformation in Indonesia with a case of Bogor Agricultural University (IPB). The case of IPB was chosen, because it is one of the leading national public universities of the country, taking up a position of dominance in education, research and community outreach. Findings indicate that IPB is an entrepreneurial university from the perspective of research-based technology transfer and innovation (Mudde et al., 2017). In addition, the student entrepreneurship output is high in relation to many other Indonesian universities.

Findings

The findings of all interviews are summarised in table 4. In Ethiopia, universities played a minor role in latent and nascent entrepreneurship of these graduates. In total, 20 per cent of all 60 characteristics mentioned were attributed to entrepreneurial university characteristics (skills, attitudes and knowledge, and access to facilities, finance, and networks). Instead, attribution to human capital characteristics (social network, work experience and training) was 60 per cent (of all the 60 mentioned characteristics), and to self-taught another 20 per cent. In Indonesia, different from in Ethiopia, the university played a larger role. In total, 51 per cent of all 78 characteristics mentioned were attributed to entrepreneurial university characteristics. These differences are in line with the difference in entrepreneurial status of the universities in Ethiopia and Indonesia, which is substantially higher in Indonesia than in Ethiopia.

Table 4: Summary of interview results

	Ethiopia (n=7)	**Indonesia (n=7)**
Total characteristics mentioned (incl. duplications)	60	78
Total attributions to Entrepreneurial University characteristics	20% of all characteristics mentioned (mentioned by 3 respondents)	51% of all characteristics mentioned (mentioned by all 7 respondents)
Entrepreneurial staff	Teacher sharing experience relevant for 1 respondent	Teacher sharing experience relevant for 3 respondents
Entrepreneurial teaching	Contribution by entrepreneurs in teaching mentioned by 1 respondent	Course work or student research contributed to business start-up of 4 respondents
Entrepreneurship support	Grant through Business Plan Competition mentioned by 1 respondent	3 respondents mentioned mentorship by a teacher; 1 received entrepreneurship training by the university; 5 participated in Business Plan Competitions and received grants; 1 respondent got access to facilities
Networking	Support in network facilitation mentioned by 1 respondent	4 respondents mentioned alumni as important for inspiration and access to facilities, information, and finance; 1 respondent mentioned networking among fellow students
International mobility	Exposure to international professors and network relevant for 1 respondent	Not mentioned
Total attributions to human capital characteristics	60% of all characteristics mentioned (mentioned by all 7 respondents)	32% of all characteristics mentioned (mentioned by all 7 respondents)
Social network	Friends, family, and fellow students, relevant for 6 respondents for skill development, business knowledge, access to facilities, finance, network	Entrepreneurship networks (2), senior business people (1), friends/partner (2) and parents (2) mentioned by 6 respondents for access to finance, business knowledge, technical skills, and network
Work experience	5 respondents learned skills as employee, prior to starting their business	2 respondents learned skills as employee, prior to starting their business
Training/education	4 respondents received entrepreneurship training and consultancy; 5 respondents mentioned relevance of university education for technical skills and theory	1 respondent participated in an entrepreneurship training and consultancy program
Self-taught	20% of all characteristics mentioned (6 respondents mentioned own efforts in learning skills and business knowledge)	17% of all characteristics mentioned (5 respondents mentioned own efforts in learning skills and business knowledge)
Nascent enterprising during/ immediately after BSc study	1 respondent (14%)	5 respondents (71%)
Pre-university entrepreneurial activities of respondents	3 respondents (43%)	5 respondents (71%)

Source: author

Entrepreneurial university characteristics

Looking more closely to the entrepreneurial university characteristics (entrepreneurial staff, entrepreneurial teaching, entrepreneurship support, networking, and international mobility), all Indonesian respondents made explicit reference to one or more of these characteristics (with exception of international mobility). In Ethiopia, only three respondents made reference to one or more of these characteristics. One student entrepreneur indicated that the university had recently put more attention to entrepreneurship development by organising inspirational speeches of experienced people (an indicator of entrepreneurial teaching) and a business plan competition: 'These speeches were very helpful and because of the competition I received a grant, which I used to invest in my business'. The importance of university-facilitated networking was illustrated by another respondent who mentioned that he got a recommendation letter from the university president, which had positive impact on his business acquisition. His first clients were also through the university network. In addition, he had received support from international professors, who shared their own business experiences. However, the main message received from all the Ethiopian respondents was that there has been no attention for strengthening entrepreneurial skills and start-up support while they were at the university, and that access to finance, facilities or networks was not facilitated.

Box 1. The technically skilled alumnus

Abemelek, 27 years of age, started two years ago his poultry farm outside Bahir Dar in Ethiopia. When he was at high school, Abemelek had several friends who had their small business. They inspired him, but – being a good grade 12 student – he first went to university studying Business Management. After his study he worked for three years as a garment agent, but was not happy in this position. The payment was bad and he wanted to do something for himself. Farming is his hobby, his grandparents were farmers, and he started three years ago with 50 chicken at his home, financed by himself, family and friends. This evolved in his current business with almost 1000 layers, serving a hospital and restaurants with eggs. Abemelek aspires to build the best agro animal industry in Ethiopia, from feed production to processing chicken meat. He indicates that his university education helped him to know how to technically manage a business, but did not develop his business skills. In particular communication skills are according to him very important for doing business in Ethiopia. He learnt a lot from his friends and from a short entrepreneurship training offered by the Ethiopia Entrepreneurship Development Centre (EDC).

The Indonesian situation is different with many examples of a supportive role by the university. Three respondents indicated that teachers had inspired and supported them by sharing their entrepreneurial experience. Concerning entrepreneurial teaching, four respondents indicated that they could work on their business start-up as part of their formal

education, whether in a course or in a research project. One respondent said: 'My company started as a course assignment in my third year of my study. Together with three other students, I had to come up with a project idea, which evolved over time in the current business'. Three respondents indicated that their final research project of their study was purposefully instrumental to their business start-up, for example: 'My final Bachelor project was helpful, because it was a feasibility study on broiler chicken. Because of this study I could make a good assessment of the revenues of my business partners'.

Five Indonesian respondents explicitly mentioned that entrepreneurship support by the university had helped them. As part of a structured support process, teachers acted as mentor of three of them: 'My teacher became my mentor and even invested privately. She stimulated me to first do research, improving my product, for which she made university facilities available for me'. One respondent participated in extracurricular entrepreneurship training: 'I joined several weekend-based entrepreneurship training workshops at the university, after which I had to submit a business proposal'. Students were actively stimulated to seek support: 'The dean of the faculty stimulated all students to come to him if they would have a business idea'.

Access to finance, as possible component of university entrepreneurship support, appeared to be relevant for many of the Indonesian entrepreneurs. Five respondents indicated that the university had given them the opportunity to join one or more business plan competitions. This resulted in grants, exposure, and relevant experience (pitching and structuring their ideas). Access to facilities, another possible component of university entrepreneurship support, appeared to be relevant in some cases. One respondent mentioned that the university had helped him with buying Chinese equipment at a time when his start-up had not yet a formal status and bank account. In another case, the testing facility of a start-up was located in a university building. The respective student could make use of this facility free of charge.

Box 2. University-born business

As of childhood, Aldi is fond of chocolate. Hence, it was obvious for him to enter the chocolate business when he decided to start a business. Together with his business partner whom he knows from his study, Aldi produces chocolate powder for drinks, chocolate bars, and chocolate snacks. The business started as a course assignment in his third year of his study agricultural technology at the Bogor Agricultural University in Indonesia. Together with three other students, among which Zaki, Aldi had to come up with a project idea. He pushed for chocolate, and they came up with the idea to develop a chocolate drink with soda: Chocofaza was born. 'Faza' is composed of the first letters of the four students, and means 'lucky' in Arabic. Whilst the inception of Chocofaza was within his university education, he and Zaki continued testing their product outside the university. Later, the university was of help in starting-up his business. His marketing teacher became his mentor. In addition, Aldi could do his final project of his Bachelor study on market development of dark chocolate drinks. Furthermore, Aldi and Zaki participated in a business plan competition of the university, and each received a grant of around 500 Euro, money they used for buying supplies and paying a friend who built their web shop.

Networking, as a characteristic of entrepreneurial university, appeared to be very relevant for four of the Indonesian entrepreneurs. This relates to university-facilitated knowledge exchange and events with businesses, research institutes, government institutes, and civil society. In particular, networking with alumni was mentioned to be important. Respondents indicated that alumni tend to support each other and that linking up to them is relatively easy. Four respondents got support from alumni in terms of their expertise, facilities, supplies, and money. Relevant to note is that one respondent referred to the importance of student life as fertile environment for skills development: 'I was very active in several student organisations and this volunteering developed my leadership skills strongly, skills that are very useful in my work as businessman'.

Human capital characteristics

All respondents, Ethiopian and Indonesian, referred to the importance of their social network, work experience, or education and training for the development of their skills, attitudes, and knowledge, or getting access to facilities, finance, and network. First, concerning the relevance of social networks, four Ethiopian respondents indicated that they had learnt from friends that started a business and shared their experiences with them. In some cases, relatives or friends contributed financially in the start-up, but in most cases they self-financed their business. Of the Indonesian respondents, all mentioned the positive influence of strong social networks, including entrepreneurial parents: 'When my father started his business, the family welfare increased, but most importantly, he had more

time for us. Hence, I decided that I wanted to become a business woman'. And: 'I learnt my business skills from my father when I worked at his company; you do not learn price negotiation at the university'. One entrepreneur indicated to work deliberately with private investors that are part of his inner social circle, and two entrepreneurs said that they had learnt a lot as member of networks that stimulate and support entrepreneurship: 'When I was 18, I joined an association of young entrepreneurs. Through this community network, I learnt a lot from mentors and started several businesses, the one more active than the other'.

Second, the importance of work experience prior to nascent entrepreneurship differed between the Ethiopian and Indonesian respondents. All Indonesian entrepreneurs except two started their business during or immediately after they had finalised their Bachelor education, versus one in Ethiopia. Most of the Ethiopian entrepreneurs started their business several years after they had finalised their Bachelor education. An important reason mentioned by all was that their work experience had made them realise – or confirmed – that they wanted to be independent. One respondent formulated this as follows: 'When I was working as an employee, all kind of issues influenced my results negatively, in particular decisions of my bosses. I became entrepreneur because I wanted to be my own boss and experience the fruits of my own efforts'.

Box 3. The entrepreneurial students

Zeamanuel (21) is running a small IT company with his friend Tabor (22). Both are still studying engineering at Addis Ababa University and know each other from high school. At that time, they teamed up when they realised that they both enjoyed working with computers, and were starting to do some freelance work. Around a year ago, they realised they had better legalise their freelancing, mainly because that would allow them to participate in tenders. They provide social media management services for companies, and develop websites.

The university has been helpful for Zeamanuel and Tabor in starting their business. Zeamanuel refers to many inspirational speeches of experienced people who came to the university. He also explains that they participated in two business plan competitions, one organised by the Ministry of Science and Technology (promoted via the university), and one organised by the university itself. In the competition from the Ministry, they ranked second and received a grant of around 1500 Euro. They won the university competition and were rewarded with a full scholarship for a Master programme at their university. They however get no support from their teachers, but also are not seeking for this. They have not informed their teachers about their company endeavour, and in a creative, but secretive way, use their internship for working at their company.

The third human capital variable, education and training, was relevant for all respondents for technical skill development. They indicated that their university study was of help technically, whether management or marketing related or on agricultural technology or animal production, but that they had learnt the most about doing business through self-study (books, magazines and internet). One of the respondents referred to this as follows: 'My university education helped me to know how to technically manage a business, but did not develop my business skills. I think that the university should focus more on how to build entrepreneurs, developing communication skills and teaching students how to relate with business partners'. University education was for several of the respondents a conscious step towards starting a company. One respondent expressed this as follows: 'I wanted to be a businesswoman for a long time, but when I was young I had no money and it was not accepted by my family. My family didn't know much about entrepreneurship. So I started preparing myself for doing business. I fulfilled a part-time university study Business Management, which helped me to understand international business theoretically'. Beyond the university, four Ethiopian and one Indonesian respondent stressed the importance of targeted entrepreneurship training and consultancy that they had received. This was offered free of charge by a specialised organisation, in Ethiopia subsidised by international donor agencies, in Indonesia by the national government: 'By chance, I joined a national start-up development programme. I pitched my idea, found team members, participated in a bootcamp, and got incubation support. Now, my business is running'.

Besides attribution to entrepreneurial university characteristics or human capital variables, most of the Ethiopian and Indonesian respondents indicated that they had acquired the needed knowledge and skills just by themselves, among others with the help of online tutorials. This is illustrated as follows: 'You need to be willing to learn by trying and error, to struggle and not to give up', and 'I taught myself how to do business through self-study and learning by doing. It all failed, but I am convinced that I have learnt a lot'.

Pre-university entrepreneurial development

Many of the respondents downplayed the importance of their university education in the development of their entrepreneurial skills and becoming entrepreneur. In most cases, entrepreneurial skills development started before they had entered university. Five out of seven of the Indonesian respondents and three of the Ethiopian respondents already had some small-scale entrepreneurial activities prior to their university education: 'As a kid at primary school I helped my mother selling cake. As teenager, I started to sell small animals, like rabbits, bantam chicken, and pigeons'. Or: 'It is my hobby to sell stuff. At the age of 16, I started my first business. I invested my own savings to start online trading of skateboards'.

Discussion, conclusions and limitations of the study

This qualitative study has researched to which extent entrepreneurial university characteristics, among which entrepreneurship education, relate to entrepreneurial behaviour of alumni that own a company. Can entrepreneurial universities substantiate their claim of substantially contributing to more entrepreneurial graduates and to increased business activities by these graduates? The findings indicate that there is no affirmative answer to this question, however some positive developments are taken place, in particular in Indonesia.

The findings point towards confirming the relatively limited relation between entrepreneurial education and entrepreneurial behaviour of graduates (Martin et al., 2013; Bae et al., 2014). Attribution by the interviewees to entrepreneurial lessons and skills learnt is for a large proportion to non-university related human capital variables: social network, work experience, and entrepreneurship training offered by specialised providers. This is in line with much of the rest of the literature that suggests lack of experience and social and financial capital to be the main constraints on youth entrepreneurship (Schoof, 2006; Brixiová, Ncube and Bicaba, 2015; Staniewskia and Awruk, 2015). In addition, in more than 50 per cent of the interviewed entrepreneurs, they had undertaken demonstrable entrepreneurial activities prior to their university education. This puts to question the role of the university in pursuing their entrepreneurial career. This seems to be in line with Bae et al. (2013) who found no significant correlation between entrepreneurship education and post-education entrepreneurial intentions when taking into account pre-education entrepreneurial intentions. The role of universities may best be considered as *supportive* to rather than *initiating of* entrepreneurial behaviour. This supports increasing attention for developing entrepreneurial attributes in primary and secondary education, hence prior to the moment that youth enters tertiary education.

Findings partially confirm that nascent entrepreneurship starts several years after graduation and work experience (Lazear, 2005; Wennberg et al., 2011; European Commission and OECD, 2014; Rauch and Hulsink, 2015; Gielnik et al., 2017; Juha, 2017): model B as depicted in figure 1 is relevant in Ethiopia whilst model A seems applicable to the Indonesian cases. The question arrising is whether this difference is related to the extent that entrepreneurial activities at universities exist. At Ethiopian universities, Mudde et al. (2015) concluded that there is limited attention for entrepreneurship, whilst the existence and results of entrepreneurship supportive activities at a university in Indonesia were assessed more positively (Mudde et al., 2017). The findings of this study are in line with these conclusions: the Indonesian entrepreneurs attribute considerably the development of their skills, knowledge, and so forth to the entrepreneurial characteristics of their university, compared to the limited attribution by their Ethiopian colleagues.

The argument to be validated can thus be that investing in developing a more entrepreneurial university that strategically supports entrepreneurial, innovative and creative behaviour of its students and staff (Gibbs, 2013), pays of in terms of *accelerating* start-up development by students and graduates. Countering this argument however is that many of the respondents had demonstrated entrepreneurial behaviour prior to entering university, questioning the determining role of the support offered by the university (Bae et al., 2014). It can be argued that those students that had already an inclination to entrepreneurship with a relatively high entrepreneurial self-efficacy, purposefully used the support offered by the university to speed-up their process towards nascent entrepreneurship, but would have started a business anyway. However, they probably would still need support to be successful. Even if they had the intent and ability, lack of experience, social and financial capital may have hampered their efforts.

The entrepreneurial university model used in this study includes entrepreneurial staff, entrepreneurial teaching, entrepreneurship support, networking, and internationalisation (European Commission and OECD, 2013). Findings indicate that from these variables the most important for entrepreneurship development were: entrepreneurial teaching staff, mentoring and access to finance (indicators of entrepreneurship support), and access to alumni (indicator of networking). This supports efforts by universities in strategically investing in staff development, in particular on entrepreneurial teaching, and in facilitating staff time and capacities to act as mentor.

With exception of access to finance, the university support mentioned by the entrepreneurs are all manifestations of social networking. This is consistent with the gowing consensus on the importance of social networks for entrepreneurship development, whether professional or personal, whether organised through the university or beyond (Nieto and González-Alvarez, 2014; Fernández-Pérez et al., 2015; Tang et al., 2016). Next to teachers, most relevant networks are alumni and entrepreneurs.

Access to finance, as indicator of entrepreneurship support organised through the university, was important for the Indonesian interviewees. The findings indicate that in a context of limited access to money, modest financial contributions are helpful during the first phase of venture creation. Students used the business plan competitions organised by the universities as a means to opportunistically get access to money. None of the entrepreneurs mentioned the plans itself as being instrumental for their business. These findings align with growing scepticism on the value added of business plans for new venture creation (Karlsson and Honig, 2009).

The findings demonstrate that acquiring expert skills is important for future entrepreneurs (Hessels et al., 2014; Lechmann and Schnabel, 2014). The respondents indicated that their

universities were important as knowledge providers, whether business related knowledge (marketing, management, business) or on technical subjects relevant for the respective business process (like agricultural technology or animal production). This traditional role of the universities seems however to be diminishing with people using internet sources to get targeted information. Furthermore, the interviewed entrepreneurs stressed more the relevance of focused entrepreneurship training and consultancy, professionally organised outside the formal education process.

Concluding, it is important to restrain from firm statements about the role of universities in start-up development as panacea of youth unemployment given the relative importance attributed to universities by the interviewed university-educated entrepreneurs. This study indicates that entrepreneurial universities seem to play a supportive and accelerating role, more than initiating latent and nascent entrepreneurship, through support by entrepreneurial teaching staff, mentoring, and by giving access to finance and alumni.

Limitations of this study

The value of this study is in its attempt to link entrepreneurial behaviour of graduates with characteristics of entrepreneurial universities. Given the small sample and the qualitative approach, the conclusions are indicative. Validation of the findings needs a more substantive, deductive study. Let alone in Indonesia, with thousands of universities spread over a multitude of islands, a broader study would be recommended that could falsify, correct, or underwrite the conclusions. At best, this could be comparative research among university-educated entrepreneurs and graduates that did not (yet) start an enterprise.

The research design of this study is purposefully built on the narratives of student-educated entrepreneurs in order to explore the relative role of their universities in their process from latent, to nascent to existing entrepreneur. This implies that there may be a bias towards entrepreneurship into the research design. Some entrepreneurs selected already had the talents to be entrepreneurial, hence it may not have mattered if they would have attended a very un-entrepreneurial university. This phenomenon is not problematic for this explorative study, but in a study that would aim to conclude for a causal relation between entrepreneurial universities and nascent entrepreneurship, such unobserved heterogeneity on the individual level needs to be untangled from the effects of entrepreneurial university characteristics.

Last, purposefully, this study has taken an individual perspective of venture creation, related to attitude, intention, skills and competencies. The context is however also of importance for understanding entrepreneurial behaviour (Gartner, 1985; Nieto and González-Alvarez, 2014; Bergmann et al., 2016) and for understanding the extent to which a university is entrepreneurial (Foss and Gibson, 2015). This asks for relating the findings of this study

to information on the entrepreneurial ecosystem in which both entrepreneurs as well as universities operate.

Chapter 6

Findings, reflections and contributions

This study attempted to get insights in entrepreneurial characteristics of universities in developing countries, to identify imperatives for and challenges encountered in a possible entrepreneurial transformation process, and to explore the results of such a transformation process. The topic was inspired by the current attention for universities' contributions to help reducing labour market mismatches in settings with high youth unemployment, including preparing students for self-employment through entrepreneurship development. The main research question that this study meant to answer, was **'How entrepreneurial are universities in developing countries?'** and the secondary research questions were **(I)** 'How can we measure the entrepreneurial intent and activities of universities in developing countries?' **(II)** 'Which factors influence how entrepreneurial a university is?' and **(III)** 'What have been the implications of becoming a more entrepreneurial university on society?'. In this final chapter, the main findings of the four research chapters are presented followed by a critical reflection on the applicability of HEInnovate (European Commission and OECD, 2013) as framework for answering the research questions. Subsequently, the research questions are answered. This chapter concludes with a reflection and a list of contributions of this dissertation to academic as well as practical debates.

Findings

Entrepreneurial university was defined as an academic organisation designed for staff and students to become more entrepreneurial, innovative, and creative, and - in partnership with many stakeholders – to create public value, operating in a dynamic context (Gibb, 2013). In a multiple-case study, 14 universities were assessed: one in Indonesia, nine in Ethiopia and four in Palestine. In addition, 14 entrepreneurs who graduated from a university in Ethiopia or Indonesia were interviewed to explore whether they attributed their entrepreneurial behaviour to the entrepreneurial nature of their universities. The findings of these four empirical studies (in Indonesia, Ethiopia, Palestine, and on nascent entrepreneurs) have been described in the four preceding research chapters.

The overall conclusion of a cross-case analysis is that at all 14 universities assessed, entrepreneurial activities were taking place, in particular entrepreneurship education. However, only the Indonesian university (the Agricultural University Bogor, IPB, see chapter two), situated in a middle-income country, could be categorised as entrepreneurial, because of its strategically embedded research-based technology transfer and innovations. This university started an entrepreneurial strategic path in the year 2000. This development was triggered by the granting of the autonomy status to the university by the government of Indonesia in combination with a serious threat of drastically reduced government funding. The institutional leadership consistently worked towards becoming a research-based entrepreneurial university, stimulating technology transfer and innovation. As a result, IPB has entered in 2016 the Top 100 of QS World University Ranking by subject on Agriculture

and Forestry and is awarded several times in Indonesia because of its contributions to innovation. Compared to other Indonesian public universities, IPB was part of the group of top ten institutions that had more than 100 students winning a grant over the last three years for their start-up. The August 2019 issue of IPB's electronic newsletter mentions that IPB is the third best public Indonesian university according to the national government (IPB, 2019).

Nine Ethiopian universities have been assessed (chapter three) showing little variation. All were operating in a top-down, central government-led context, in which the Ministry of Education among others had instructed the universities to strengthen entrepreneurial mindsets of the students. The universities faced limited discretion: university leaders had to obey the instructions from the central government and a large proportion of staff had the inclination to act on command. As a result, entrepreneurship education was being set-up, but in general, there was a lack of an entrepreneurial vision, mission, and strategy. Partnering with external stakeholders was limited. Some of the universities showed more entrepreneurial activities than other universities, which coincided with a positive orientation of institutional leadership towards entrepreneurial initiatives. The study concluded that it is questionable whether the universities were effectively contributing to creating young, entrepreneurial Ethiopians with the right skills to find (self-)employment and help boosting the economy.

In Palestine, more specifically in the West Bank, the four universities assessed demonstrated an entrepreneurial zeal (chapter four). In their diversity, they all set-up activities to strengthen entrepreneurial attributes of their students and to link education with industry. A strong push factor identified in this research was the prominent influence of international donor agencies that made funds available for conquering the huge problem of youth employment in the country: the unemployment rate is above 40 per cent (ILO, 2016). This study concluded that the Palestinian universities were good examples of socially and culturally engaged (or civic) universities (Goddard and Kempton, 2016) more than being entrepreneurial. Furthermore, it concluded that the notion of an entrepreneurial university as an important contributor to innovation through research often does not apply in a developing context.

The final research chapter of this dissertation (chapter five), on university-graduated nascent entrepreneurs in Ethiopia and Indonesia, resulted in the indicative conclusion that entrepreneurial universities may play a supportive and accelerating role in entrepreneurship development of their students. They can do so through support by entrepreneurial teaching staff, mentoring, and by helping to give access to finance and alumni. However, this study also pointed to the limitations of the role of universities: the relation between entrepreneurial education and entrepreneurial behaviour of graduates seems to be limited and in most of the cases, university-educated entrepreneurs only started a business after several years of work experience after their graduation.

Characteristics of an entrepreneurial university

As described in the first chapter of this dissertation, this study gave specific attention to five characteristics, which are **I)** strategic intent, **II)** leadership, **III)** integrative approach; **IV)** engagement with society, and **V)** support to student entrepreneurship. Table 1 presents the main findings per country on these five characteristics. The findings indicate that with exception of 'integrative approach', all characteristics were present at the Indonesian university. These characteristics were absent or weak at the Ethiopian universities, while a more mixed picture is found at the Palestinian universities.

Table 1: Findings per country of five characteristics of an entrepreneurial university

	Indonesia (1 university)	Ethiopia (9 universities)	Palestine (4 universities)
Strategic intent	Yes: since 2000 strategy to become a research oriented entrepreneurial university	No: lack of an entrepreneurial vision, mission, and strategy	Mixed findings: strategies differ, i.e. academic excellence oriented, innovation based, entrepreneurial, opportunity driven
Leadership	Yes: university leadership stimulated entrepreneurial university transformation with a focus on commercialisation of faculty-based research	Mixed findings: a positive orientation of some university presidents coincided with more entrepreneurial activities	Mixed findings: exemplary personal leadership of the university president and sense of team spirit among deans at the most entrepreneurial university
Integrative approach	No: focus on research only with a lack of internal coordination. Many teaching staff did not know what was expected from them in terms of entrepreneurship	No: some entrepreneurial activities were starting up, mainly in education, not strategically embedded	No evidence of coordinated, integrative approach
Engagement with society	Yes: high engagement with society with a tradition of community development, but limited institutional partnering with business; networking through personal relations and alumni	Limited: engagement with society in the area of community development; hardly any institutional partnerships with private sector, a.o. because of no experience and absence of companies	Yes: high engagement with society, universities rooted in the locality; limited institutional partnering with businesses, a.o. because of no experience and little possibilities
Support to student entrepreneurship	Yes: many activities undertaken but not coordinated; entrepreneurship education compulsory for all BSc students; student entrepreneurship outputs were high in relation to many other Indonesian universities	Starting up: limited activities on entrepreneurship development, with a focus on entrepreneurship awareness and elective course on entrepreneurship; no structural programme found in support of student entrepreneurs	Starting up: entrepreneurial activities were starting-up mainly in the area of education; a few entrepreneurship awareness and - development programmes for students; incubators were about to start

Source: author

With these five characteristics in mind, this study leads to three cross-cutting observations. First and foremost that top leadership matters. Second, all universities assessed are strongly engaged with society and have a growing but limited cooperation with the formal private sector. Third, entrepreneurship education is on the rise.

Leadership. The cross-case analysis demonstrates that top leadership matters. All universities assessed in which more entrepreneurial activities were taken place were administered by a university president that demonstrated a positive attitude and active support towards

entrepreneurship development and new initiatives. This was the case at IPB in Indonesia, at two Ethiopian universities and at Palestine Technical University Kadoorie (PTUK). This exemplary role of the university president in person seems to be crucial for shaping the entrepreneurial agendas of these universities. Although this confirms earlier studies on the role of leadership (Vorley and Nelles, 2009; European Commission and OECD, 2012; Coyle Gibb and Haskins, 2013; Gibb, 2013), it deviates in the sense that this study points specifically to the person at the helmet of the university more than to the wider internal or external leadership. This coincides with a high score of African, Asian and Arabic countries on the 'Power distance' dimension of the Hofstede model of national culture, indicating the prevalence and acceptance of a hierarchical order in which subordinates expect to be told what to do (Hofstede Insights, 2019).

Strong engagement with society. At all universities assessed, there is a strong responsibility for socio-economic development and a strong political and moral obligation of serving the community. Local communities are offered free of charge training and services, support by groups of students, and academic staff is running community development projects. However, this is in most cases separate from regular education and research. In this sense, the universities could be considered engaged, contributing socially and culturally to their local and regional communities (ACEEU, 2016b).

When zooming-in on cooperation with the formal private sector, the cross-case analysis shows that collaboration with private sector is still limited but growing. This is for instance stimulated through donor agencies as in the case of Palestine or internal university strategies as is the case at IPB. The limited cooperation has several reasons. First, the formal private sector in countries like Ethiopia and Palestine is small, scarce in some regions, with limited capacities and experience in dealing with knowledge institutions. In addition, the further away from capital, the weaker the economic players often are, hence the less options for collaboration. The entrepreneurial ecosystem in which the universities operate is weak. Furthermore, university staff and administration have little experience in dealing with businesses.

Entrepreneurship education on the rise. All universities assessed considered it their obligation to help prepare students to find a good place in the labour market, and in this context were increasingly offering entrepreneurship education. In Ethiopia, most of the universities started to offer entrepreneurship awareness training for all Bachelor students and entrepreneurship centres were being set-up. In Palestine, elective entrepreneurship courses were started to be offered and students were stimulated to set-up their own projects after graduation. At IPB in Indonesia, many activities took place, from a compulsory introductory course up to mentoring of students that had business ideas. In most cases, all of these entrepreneurship education activities were not a strategic (re)orientation, but a

pragmatic introduction of new activities carried by individual entrepreneurial teachers. The activities were in addition to what was already offered by the university, hardly interrelated with research, other education programmes or with community service.

Conclusions and reflections about HEInnovate

In this research, the HEInnovate assessment framework was used for answering the research questions. At the time of the start of this dissertation, HEInnovate was labeled as 'a guiding framework for entrepreneurial and innovative higher education institutions' (European Commission and OECD, 2013). The 2015 version has been used with seven categories (Leadership and Governance, Organisational capacity, Entrepreneurial Teaching and Learning, Preparing and Supporting Entrepreneurs, Internationalisation, and Impact measurement).

Although HEInnovate was primarily developed for higher education institutions in Europe, it was selected because it was the operationalisation of the definition of entrepreneurial university as used in this research, and it was the most recent, comprehensive and already validated framework available. In this study, the applicability of the framework in a developing country context has been tested. In Indonesia, HEInnovate has been tested in the in-depth case of IPB. In Ethiopia, the framework has been used for comparing nine universities. In Palestine, the framework was the guiding instrument for comparing four universities, taking into account the specific complex context in which these universities operate. And last, the HEInnovate framework was used in the analysis of characteristics of university-graduated entrepreneurs.

Based on this study, it can be concluded that HEInnovate is applicable in a developing country context for assessing entrepreneurial characteristics of universities. The framework offers a comprehensive model with categories that are useful for describing entrepreneurial strengths and weaknesses of – as it seems – any university. It captures a multitude of factors that influence a possible transformation towards a more entrepreneurial university. Furthermore, HEInnovate has proven to be useful in comparing universities, in particular universities operating in a similar national context. The latter is evidenced as well by the reviews of higher education in several (European) countries that are published on the HEInnovate website (European Commission and OECD, 2013), including a review of Dutch higher education institutions (OECD and European Commission, 2018).

However, several critical reflections are to be made. First, HEInnovate, being developed for universities in Europe, assumes that staff and students can study, live and work safe and peacefully with access to basic resources. In particular at younger universities in more remote areas in developing countries, these conditions may not be in place. HEInnovate

includes no reference to the level of conduciveness of the university campus for teaching and learning.

Second, literature on higher education in developing countries stresses the societal role of universities, reflected in concepts of 'development universities' (Grobbelaar and De Wet, 2016) or of civic or engaged university (ACEEU, 2016b; Goddard and Kempton 2016). This relates with the attention for social entrepreneurship that worldwide becomes increasingly popular (Bosma, Schøtt, Terjesen and Kew, 2016; Betts, Laud and Kretinin, 2018) and resonates with criticism on the concept of entrepreneurial university to be too business oriented (Audretsch, 2014). Although the relation of the university with the local community is part of the HEInnovate framework, it is only one out of the many variables. One could argue, supported by the findings of this study, that this non-economic societal role deserves more attention in the framework when applied in a developing country.

Third, HEInnovate is seemingly presented as culture-neutral. No indication is given on how culture may impact the interpretation and understanding of the concepts and statements used and the perceptions of the respondents. Thus, the same score may have different meanings in a different context; interpretation of the survey-based perception scores needs triangulation with additional data.

Fourth, the magnitude of the framework complicates data collection and – analysis. Even more, different, possibly opposing conclusions on the entrepreneurial status of a university could be drawn for the same university using another variable. A university may be more entrepreneurial in certain aspects of the entrepreneurial university framework than in another. For instance, IPB was considered entrepreneurial in its leadership, but knowledge exchange with private sector was assessed more critically.

Fifth, the focus of HEInnovate is on getting an understanding of the entrepreneurial status of the organisation, but is not giving any attention to external factors that may affect this status, whether positively or negatively. To name for instance the influential role of donor agencies as explained in the research on the Palestinian universities. HEInnovate thus leaves untouched any relation between a possible transformation towards a more entrepreneurial university and the wider entrepreneurial ecosystem in which the university operates. It neither measures the interdependence among factors, whether internal or external, nor identifies the relative weight of each factor.

Sixth, another important limitation of the HEInnovate framework is that the application of this framework results in a snapshot, demonstrating the situation at a university at the time of data collection. Analysing a transformation process at a university would require a longitudinal approach through for instance several assessments at different moments. In

that case, change over time could be captured by comparing the latest assessment against previous assessments.

Seventh, the focus of the HEInnovate framework is on assessing inputs and throughputs – the entrepreneurial nature of a university – with the aim to improve the functioning of a university. The framework assumes a relation between these inputs, throughputs and possible outputs and outcomes, but as such is not measuring these relations. A more rigorous framework will be needed for relating inputs of an entrepreneurial university with – at the end – impact.

Eighth, although the framework allows for a certain level of comparison among universities within a similar context, this has its limitations. The reason is that HEInnovate is perception-based. Comparison among universities regardless the context would need a set of quantitative indicators, normative in the sense that they are scaled to total number of staff, students or other.

Last, it should be noted that HEInnovate has been extended in 2018 with an eight category, named 'Digital Transformation and Capability'. This addition reflects the development of HEInnovate over the years. Whilst the 2015-version used in this dissertation is about assessing entrepreneurial universities, HEInnovate is currently positioned as instrument 'for Higher Education Institutions who wish to explore their innovative potential' (heinnovate.eu, accessed 19 December 2019). Whilst it is logical to include in this twenty-first century explicit attention for digitalisation, one may argue that HEInnovate is losing its specificity by including any feature that may characterise a modern university.

Summarising, the HEInnovate framework is useful in describing the entrepreneurial status of a university, more than measuring this status, capturing change over time or relating the university to the ecosystem in which it operates. In this research, these limitations have been addressed in several ways:

Beyond the surveys developed in this study that were capturing perceptions of staff and students on the HEInnovate characteristics of an entrepreneurial university, this research used interviews, focus group discussions, desk research of university documents and websites, and observations. This allowed for interpretation of the survey results and resulted in information on change over time, on the influence of external factors (using the PESTEL categorisation), differences between universities, and on the implications of becoming a more entrepreneurial university on society.

Additional information on change over time within a university was received through timeline analysis. This approach has resulted in valuable insights about IPB and helped to understand its organisational transformation process.

Furthermore, four quantitative output indicators were tested in the Indonesian study as a way to measure differences among universities. This were the total number of student start-ups over the last three years, the percentage of funding generated by the university through spin-offs, business development services, and joint ventures (of the total university budget), the percentage of externally sponsored research (of the total research budget), and the number of (commercialised) patents. These indicators were chosen because they in togetherness covered a large part of the HEInnovate framework and matched IPB's choice for entrepreneurial commercialisation.

Last, in the research that explored whether entrepreneurial universities would be more fit to produce entrepreneurs (chapter five), the HEInnovate framework was complimented by the framework of Frank (2007) for entrepreneurial learning elements and with variables affecting individual entrepreneurial behaviour grounded in human capital theory (social network, work experience, and training) (Martin, McNally and Kay, 2013).

When relating the above to the three research questions of this study, the following can be concluded. HEInnovate is fit to answer the first research question. With respect to the second research question, HEInnovate is appropriate for identifying internal factors that influence how entrepreneurial a university is, but not for identifying external factors, nor indicating the interrelation and weight between factors. Last, in reflection to the applicability of HEInnovate in responding the third research question, complementary frameworks and methods were needed, because HEInnovate is not measuring the effects of an internal change process on society.

Subsequently, the cross-cutting findings will be used to answer the three research questions.

Research question 1: How can we measure the entrepreneurial intent and activities of universities in developing countries?

As explained above, HEInnovate has proven to be an appropriate framework - with certain limitations - for capturing the entrepreneurial intent and activities of universities in developing countries. The framework has been tested at 14 universities in Indonesia, Ethiopia and Palestine, which resulted in descriptions about their entrepreneurial intent and activities. Standardised Likert-scale based surveys developed in this study were used for measuring the views of the university communities about the entrepreneurial status of their universities (appendix two and three). They can be used to compare universities in a similar

context, read country. In general, the universities assessed in Ethiopia and Palestine were scoring below average or slightly above, whilst the Indonesian university scored highest.

Thus, the first research question can be answered as follows: the entrepreneurial intent and activities of universities in developing countries can be measured by using HEInnovate as framework, operationalised by standardised Likert-scale surveys, complimented by other sources of information in order to interpret survey results, and by quantitative indicators that will enable comparison among universities.

The second research question is:

Research question 2: Which factors influence how entrepreneurial a university is?

The four empirical studies presented in this dissertation capture a multitude of factors that initiate, hamper or support how entrepreneurial a university is. These factors can be categorised by internal to the university and by external to the university, and are presented in table 2. Other factors may be of importance as well, but have not been part of the findings of this research. The factors printed in bold are those that have been found in all the three countries of this study. The internal factors are grouped using the appropriate categories of HEInnovate. The external factors are grouped using the PESTEL categorisation. The letters stand for Political, Economic, Social, Technological, Environmental and Legal. A PESTEL analysis is a tool that is used to identify macro external forces influencing an organisation.

Table 2: Internal and external factors influencing how entrepreneurial a university is

Internal to the university (HEInnovate)	External to the university (PESTEL)
Leadership and governance • **Strategic intent** (IND+ETH+OPT) [1] • **(Exemplary) Leadership** (IND+ETH+OPT) Organisational capacities • Working, teaching and learning environment (ETH) • Management culture and practice (IND+ETH) • (Bureaucratic) University regulations and procedures (ETH) • Level of individual discretion (ETH) • **Coordination and communication** (IND+ETH+OPT) Teaching and learning • Staff development in entrepreneurial teaching (IND+ETH) Support to Entrepreneurship • Facilitation of mentorship (IND+ETH) • Individual revenue-generation versus institutional interest (IND) • Experience level of staff (IND+ETH) Knowledge exchange and partnerships • **Research capabilities** (IND+ETH+OPT) • **Strength of social network** (IND+ETH+OPT) • 'Knowledge transfer' versus 'co-creation' mindset (IND) Internationalisation: no factors found	Political • **Funding of universities** (IND+ETH+OPT) • Innovation and research policy (IND) • Political (in)stability (ETH+OPT) • (in)Security (OPT) Economic • **Availability and maturity of formal private sector** (IND+ETH+OPT) • **Youth (un)employment**, government and donor agencies priorities on (IND+ETH+OPT) • National economic outlook (OPT) • Access to goods and resources (OPT) • Capability of government institutions (ETH) • Priorities of donor agencies (OPT) • Level of income (IND) Social • Pre-university entrepreneurial activities (IND+ETH) • Strength of social network (IND+ETH) • Ease of mobility (OPT) Technological: no factors found

[1] IND = Indonesia; ETH = Ethiopia; OPT = Occupied Palestinian Territories
Source: author

First, the most important internal and external factors are explained and related to literature, after which possible interrelations between factors and their relative importance are discussed. This section in which the second research question is addressed will be concluded by exploring differences among different types of universities.

Internal factors

The four empirical studies of this dissertation resulted in a number of internal factors that influenced the entrepreneurial status of the universities assessed, confirming extant literature (Clark, 2004; Etzkowitz, 2004; Vorley and Nelles, 2009; European Commission and OECD, 2012; Coyle et al., 2013; Gibb, 2013; Fayolle and Redford, 2014; Foss and Gibson, 2015; Maritz, Koch and Schmidt, 2016; Leih and Teece, 2016), see table 2. Those determining factors that have been found at all 14 universities are strategic intent, (exemplary) leadership, coordination and communication, research capabilities, and strength of social network (Fernández-Pérez, Alonso-Galicia, Rodríquez-Ariza and Fuentes-Fuentes, 2015; Tang, Chen, Baskaran and Tan, 2016). The other internal factors were found only in the assessment of one or some of the universities.

A strategic intent, operationalised in a strategic plan appeared a fundamental factor determining an institutional-wide change process (Gibb, 2012). A consistent strategic orientation at IPB over a period of more than ten years demonstrably resulted in a research oriented entrepreneurial university, whilst the non-entrepreneurial Ethiopian universities were characterised by – among others – a lack of university-specific entrepreneurial visions, missions, and strategies. In Palestine, at one of the universities assessed, a strategic entrepreneurial transformation process started and at another university an entrepreneurial vision and agenda were implemented, whilst such a coordinated approach was not present at the other two Palestinian universities.

The importance of (exemplary) leadership is extensively evidenced in this dissertation, underlining the relevance of this determining factor for initiating, guiding or facilitating a change process (Vorley and Nelles, 2009; European Commission and OECD, 2012; Coyle et al., 2013; Gibb, 2013). The Indonesian case demonstrates that consistent leadership matters. Also in Ethiopia, the more dynamic universities were those with a leader that was more receptive to entrepreneurship development. And in Palestine, a period of growth and innovation of the most entrepreneurial university assessed was pushed by the university president.

Internal coordination of entrepreneurial activities and communication of these activities, results and rationale are confirmed to be relevant (European Commission and OECD, 2013). In most of the universities assessed internal coordination and communication was weak, resulting in different interpretations among staff of what was expected from them, and

scattered, potentially duplicating activities. The most entrepreneurial university in Palestine was characterised by a coordinated strategy implementation with all deans involved.

In most cases, the absence of research capabilities was found to be a bottleneck in cooperating with businesses, which is a core aspect of an entrepreneurial university (Etzkowitz, 2004; Clark, 2004; Gibb, 2013). Most of the universities assessed focused on teaching of undergraduate students. The exception was IPB with its explicit strategy to become an entrepreneurial research university with the results as already described. One of the Palestinian universities, An-Najah National University, emphasised in its strategy scientific excellence in education and in research, but had not (yet) related this focus with a possible entrepreneurial agenda.

The last prominent internal factor that needs mentioning is strength of social network, which is considered to be important for entrepreneurship development (Fernández-Pérez et al., 2015; Tang et al., 2016). In particular the study among the university-graduated entrepreneurs (chapter five) pointed to the importance of university staff having a network that can be accessed for a diversity of reasons (funding, resources, ideas, guidance). Whilst the Indonesian network – in particular through alumni – appeared to be strong and accessible, the Ethiopian university staff was less experienced in networking. In Palestine, social networking was strong, although still limited with business.

Although not explicitly touched upon in the assessments of all the universities, but still important to mention is the conduciveness of the environment for working, teaching and learning. In particular at younger Ethiopian universities in more remote areas, the living and working conditions appeared less conducive for teaching and learning, let alone for stimulating creativity and entrepreneurship. Access to books, computers, internet, but also good sanitary facilities was limited. This observation is in line with the conclusion of Grimaldi, Kenney, Siegel and Wright (2011) who pointed to the underestimated importance of universities to provide *'a protected environment where students can experiment with new ideas and follow their passions'* (2011: 1047). The campuses of the universities assessed in Indonesia and Palestine, almost all older than the universities in Ethiopia, appeared to be well developed.

Last, absent in the internal factors are factors related to internationalisation, one of the categories of HEInnovate. Although international relations were present or fostered by universities, it was not considered to have a (major) influence on the entrepreneurial agenda. The reason may be twofold. First, the attention for entrepreneurship was relatively recent and mostly concentrated on introducing entrepreneurship education for local start-up development. Secondly, the integration of entrepreneurial activities in the wider university system was found to be weak. Internationalisation was organised separately from those

university staff or units dealing with entrepreneurship. Literature evidences however that internationalisation helps. Vandor and Franke (2016) in their thorough study among Austrian students and entrepreneurs who had lived and worked abroad for more than six months, argue that cross-cultural experiences increase 'the ability to recognize entrepreneurial opportunities'. Also Minoli, Donina and Meoli (2016) conclude that internationalisation positively relates to student entrepreneurship. In their study using data of 28,855 students from 130 European universities they state that internationalisation of education increases human and social capital of students, which in turn has a positive effect on their engagement in entrepreneurship. Furthermore, they found that students benefit indirectly from faculty and staff that are participating in international research and knowledge transfer.

External factors

In the understanding that universities are to be understood within their specific context (Gjerding, Wilderom, Cameron, Taylor and Scheunert, 2006; Foss and Gibson, 2015), several contextual factors have been found that appeared to be relevant for all the universities assessed. These are: institutional autonomy, funding, availability and maturity of formal private sector, and youth (un)employment. Whilst institutional autonomy and funding are known factors from literature (Clark, 1998, 2004; Etzkowitz, 2004; European Commission and OECD, 2014, Etzkowitz, Bikkulov, Kovaleinen, Grey, Leitner and Poutanen, 2017), availability and maturity of formal private sector, and youth (un)employment may be more specific for the developing countries assessed. The other external factors in table 2 may also be relevant for all the universities assessed, but were found only in the assessment of one or some universities.

The entrepreneurial transformation at the Indonesian university started when it became more autonomous from government, the Palestinian universities were autonomous in making their own choices, but an entrepreneurial spark was absent at the government-led Ethiopian universities that had little autonomy. The same pattern is applicable to funding: a serious possibility that government funding would decrease was an important trigger for the Indonesian university to re-strategise to becoming a more entrepreneurial institution. The Palestinian universities, structurally confronted with restrictive government funding, had to develop alternative, more market-oriented income strategies. But the Ethiopian universities, almost fully funded by the central government, lacked a financial imperative to become more entrepreneurial. However, also in Ethiopia, government support to universities has become under pressure, which led to starting-up income-generating activities (Feleke, 2015).

Whilst the relation with industry is at the heart of the entrepreneurial university concept (Clark, 1998, 2004; Etzkowitz, 1998, 2004; Gibb, 2013), the explicit attention for the availability and maturity of formal private sector is less prominent in the literature. This is

understandable given that the overarching majority of studies on entrepreneurial universities is on universities in developed countries that have a large, well-established formal private sector. This study has found that an entrepreneurial development by universities in the countries assessed is seriously hampered due to the restrictive practical possibilities for engaging with the formal private sector. As such, it confirms the conclusion of Stensaker and Benner that 'entrepreneurialism rests upon powerful and resourceful networks that are not readily available to all' (2013: 404).

The final external factor that appeared to be relevant for all universities assessed is the level of employment opportunities for youth. This study found a large pressure by government and donor agencies on the higher education sector to help overcome youth unemployment through entrepreneurship education and supporting business development of graduates. This resulted in inserting entrepreneurship in university strategies, offering entrepreneurship (awareness) courses, setting-up university entrepreneurship centres and incubators, mentoring of students, and giving students access to networks, facilities and finance.

Interrelation of determining factors

An interesting conclusion of this dissertation would be to identify which factors are more important for becoming an entrepreneurial university than others are, and which factors may be interrelated. Some qualitative conclusions can be drawn, by taking into account that HEInnovate used in the four empirical studies was meant neither to measure the interdependence of determining factors, whether internal or external, nor to identify the relative weight of each factor.

The empirical studies show that at those universities that were assessed to be more entrepreneurial, in particular IPB in Indonesia and PTUK in Palestine, a more entrepreneurial strategic intent, university leadership at the top of the institution receptive to entrepreneurship development, and institutional and individual autonomy went hand in hand. With these three enablers in place, a university seems to have the potential to engage in a transformation process towards becoming more entrepreneurial. Dependent on other internal and external factors as listed in table 2, the university could become entrepreneurial in the sense of research, innovation and commercialisation, as in the case of IPB, or focus more on student entrepreneurship, which was more visible at universities in Palestine and in Ethiopia. The importance of these three enabling factors is supported by literature, as explained above.

Another important interrelation among determining factors relates to the motivation for and initiation of an entrepreneurial transformation within the university. Etzkowitz (2004) states that the lever for becoming more entrepreneurial as university is an increased interaction

with industry and government, Clark (1998) points to a changing funding base, read reduced government funding. This study however confirms the conclusion of Foss and Gibson (2015) who point to the interplay of an initial external impetus for change and 'exceptional leaders'. The more entrepreneurial universities assessed in this study were those in which exemplary leadership of the university president reacted on an external trigger, in particular a (possible) reduction of government funding, government and donor agencies' priorities on youth employment, and an increased institutional autonomy. This underlines the importance for entrepreneurial leadership that is able to sense and seize opportunities and subsequently transform the university (Leih and Teece, 2016).

Differences between universities

A next step in the analysis of the factors influencing entrepreneurial transformation is to explore whether differences exist between different types of universities. In this study, the universities assessed were located in a Least Developed Country and in Lower Middle Income Countries according to the OECD country classification (OECD, 2018). In addition, the universities were selected by using four theoretically grounded criteria (Clark, 1998, 2004; Gibb, 2013): **I)** funding base: public or private; **II)** size: more or less than 10,000 students; age: more or less than 15 years; and **IV)** academic profile: comprehensive or specialised. The empirical findings indicate that in particular the national economic situation and the age of the university seem to affect on how entrepreneurial a university is.

The research findings demonstrate that for the 14 universities assessed, one can conclude that the higher the respective country is on the ladder of the OECD country list (thus the higher the national income), the more entrepreneurial the universities are. This is fully in line with the position as presented in the introductory chapter of this dissertation, using the stages of development from the Global Competitiveness Report (Lopez-Claros, 2006). The Ethiopian universities, with limited resources, incentives, networks, and experience, operating in a factor-driven economy, are to be considered not as entrepreneurial. The picture of the Palestinian universities, operating in a complex legal, social and political context but in a slightly more advanced economy (categorised as in transition from factor-driven to investment-driven economy), is mixed, with an identifiable entrepreneurial zeal. The Indonesian university, operating in a context with a larger formal private sector, being more experienced, better resourced and networked in an economically stronger country (in transition from investment-driven to innovation-driven economy), is assessed to be entrepreneurial.

Whether a university was (mainly) private or publicly funded appeared not to be relevant in relation to the existence of internal factors conducive for entrepreneurial transformation. Within the countries, differences were marginal. The same applies to the size (student numbers). Concerning the academic profile, the findings point to the fact that the specialised

universities among all 14 universities assessed were more conducive to entrepreneurial change than the other, concurring Clarks findings (1998). They had a more entrepreneurial strategic intent, leadership, and were more active in knowledge exchange and partnerships.

The most prominent difference is the age of the institute. Comparing the 14 universities leads to the conclusion that internal factors at older universities are more conducive to entrepreneurial transformation than at young universities. The most relevant factors are: a more conducive working and learning environment, more experienced staff, more research capabilities, and a stronger and larger social network. The latter includes a bigger network of alumni who may have entered senior positions (Tang et al., 2016). In the context of developing countries, this is the more relevant, because universities in developing countries are relatively young, sometimes very young like in the case of Ethiopia. They will face more difficulty in attracting funding, building up a reputation as knowledge provider, and in recruiting the best staff and students. It will be more difficult for these universities to be entrepreneurial in the sense of contributing to innovation through research-based commercialisation (Etzkowitz, 2004; Stensaker and Benner, 2013; Etzkowitz et al., 2017). The empirical findings that the age of the university is important deviates from the conclusion of Foss and Gibson (2015), who argued that clustering of universities around size and age is not useful for describing entrepreneurial differences.

Last, a word of caution is at place here. The oldest university (IPB) is located in the country with the highest national income, the younger universities are located in Palestine, whilst the youngest universities all are located in Ethiopia, which is a low-income country. Thus, attribution of differences in how entrepreneurial a university is may be related to the age of the institution or to the national economic situation, or to an interplay of both.

The third research question is:

Research question 3: What have been the implications of becoming a more entrepreneurial university on society?

Youth employment and entrepreneurship

An important role for universities is to prepare students for a position in the labour market, in particular undergraduate students who are the overarching majority of the student population at the universities assessed. However, there is a labour market mismatch and restrictive absorption capacity in many developing countries resulting in youth unemployment as explained in chapter one.

Improving the position of university graduates requires them to have those skills that are needed by the labour market. These so-called twenty-first-century skills are skills related

to self-awareness, collaboration, and problem-solving, like communication, teamwork, leadership, and customer service skills (Mitchell, Skinner, and White, 2010; Griffin and Annulis, 2013; Stawiski, Germuth, Yarborough, Alford, and Parrish, 2017). These skills overlap with what are considered entrepreneurial skills[18]. In particular for higher educated workforce, entrepreneurial thinking and acting, in combination with digital and leadership skills, are considered essential to be successful as employee or in business (Pegg, Waldock, Hendy-Isaac, and Lawton, 2012; Majovski & Davitkovska, 2017; Obschonka, Hakkarainen, Lonka and Salmela-Aro, 2017). Young people need to be able to use and manage *'the various work-related opportunities and uncertainties brought in the wake of current social and economic change'* (Obschonka et al., 2017: 488). Thus, a university strengthening the entrepreneurial skills of its students is expected to graduate students that are better positioned on the labour market, whether self-employed or as employee

The underlying assumption of this study has been that entrepreneurial universities 'create' more entrepreneurial graduates who are better able to create a job or to find a job than graduates from less entrepreneurial universities. The empirical findings point towards confirming this assumption, which is explained below.

This study has found that in most cases the universities assessed responded to the call for strengthening entrepreneurial skills by developing stand-alone entrepreneurship education with the main purpose to stimulate self-employment. The underlying notion of these activities is a narrow definition of entrepreneurship as new business creation (by students and graduates). In the research as captured in this dissertation, entrepreneurship was broader defined, as the tendency to create value through identification and exploitation of opportunities (Shane and Venkataraman, 2000). This broader view resonated at two universities (Al Quds University in Palestine and IPB in Indonesia), in which a process to mainstreaming entrepreneurship in teaching and learning was recently initiated through reviewing intended learning outcomes. Instead of focusing on business creation only, an attempt was made to integrate competencies and skills associated with entrepreneurship in all curricula and thereby strengthen the position of their graduates on the labour market (Obschonka et al., 2017).

Concerning stimulating self-employment, two of the empirical studies of this research have tried to link university processes with enterprise development by students and graduates. First, the study in Indonesia compared the total number of student start-ups over the last three years at IPB (scaled to the total number of students) with data from 77 other

[18] Entrepreneurial skills are: opportunity seeking, initiative taking, willingness to take ownership, commitment to see things through, strong sense of autonomy, intuitive decision making with limited information, networking capacity, strategic thinking ability, negotiation capacity, selling/ persuasive capacity, achievement orientation, willingness to take risks (Frank, 2007: 639-640).

public higher education institutions in Indonesia. It demonstrated that IPB was among the highest scoring universities with more than 100 students winning a government grant in support of their start-up. This is not an indication for the viability of these start-ups, but it does demonstrate that IPB has a conducive environment that allows and enables students grasping a business opportunity and receiving funding for it. In comparison, student start-up activities at the universities in Palestine and Ethiopia were limited. Thus, the highest number of student start-ups were found at the only university that has been assessed in this study to be entrepreneurial in the sense of stimulating creativity, innovation and entrepreneurship among its students (Gibb, 2013). This indicates that a transformation towards a more entrepreneurial university seems to be positively related to the emergence of student start-ups.

Second, the case study among Ethiopian and Indonesian university-graduated entrepreneurs demonstrated that the entrepreneurs that graduated from IPB felt to have received more benefits in the sense of skills, resources and network than those who were graduated in Ethiopia. The Indonesian entrepreneurs considerably more attributed their entrepreneurial behaviour to characteristics of an entrepreneurial university than their Ethiopian colleagues did, in particular support by entrepreneurial teaching staff, mentoring, and by giving access to finance and alumni. In essence, all of this support are manifestations of social networking. This confirms the importance of social networks for entrepreneurship development (Fernández-Pérez, Alonso-Galicia, Rodríquez-Ariza and Fuentes-Fuentes, 2015; Tang et al., 2016), and that an university could play a facilitating role in giving access to these networks (Lilischkis, Volkmann, Gruenhagen, Bischoff, and Halbfas, 2015).

This calls for empowering staff to become more enterprising. This study has found that initiatives organised by the university to stimulate enterprising behaviour of staff were however limited. In Ethiopia, most of the teaching staff lacked practical experiences and training on how to provide entrepreneurship education. Although staff development through pursuing MSc or PhD education was well organised at Ethiopian public universities, entrepreneurial capacity building got limited attention. Furthermore, no organised support existed for business development by staff with exception of one important financial incentive. As part of their staff retention scheme, several of the Ethiopian universities had formalised an incentive system for business development that allowed staff to keep a certain percentage of possible business revenues. At one university, located very far away from capital, this percentage was up to 90 per cent. In Palestine, some recent examples were found of strengthening staff capacities on entrepreneurial teaching and business engagement. A few staff members had received training on entrepreneurial teaching and at one university, staff could participate in an exchange programme with a commercial bank. In Indonesia, staff support mechanisms were operational at IPB aiming at commercialisation of research, which was fully in line with the strategic priority of the university. However,

teaching staff was of the opinion that entrepreneurial and innovative initiatives were not incentivised and they largely undertook consultancy work outside the university as an individual revenue-generating activity.

Although this study has made clear that there is plenty of room for improvements, one need to be careful in expecting too much from universities. The empirical findings point towards the relatively limited relation between entrepreneurial education and entrepreneurial behaviour of graduates (Maritz et al., 2016; Bae, Qian, Miao and Fiet, 2014). They also support the importance of work experience before starting up a business (Lazear, 2005; Wennberg, Wiklund and Wright, 2011; European Commission and OECD, 2014; Rauch and Hulsink, 2015; Juha, 2017), which is a relevant factor of employability in general (Park and Seol, 2016). Thus, although the study among the university-graduated entrepreneurs concluded that entrepreneurial universities may play a supportive and accelerating role in entrepreneurship development by its students and graduates, we need to acknowledge that the contribution of universities – whether entrepreneurial or not – to immediate enterprise development of their students and graduates seems to be limited.

Last, having the ideal skill set is not a guarantee for finding a decent job or becoming successful in business. Employability also depends on personal experience, knowledge and understanding, and personal attributes (Pegg et al., 2012). Equally important in the context of this study is the limited absorption capacity in developing countries with large young populations. In many countries, the expansion of higher education has led to over-education that exceeds job requirements (Park and Seol, 2016). A case in point is Ethiopia where about 40 public universities have been founded over the last 15 years. This asks for critically look into the role of universities in the society in which they operate.

Universities in society

The role of universities in developing countries, in particular when located further away from capital cannot be underestimated. The empirical findings demonstrate that the universities assessed often operate in a context of weak formal institutions. Capabilities of government institutions are weak in the case of Ethiopia and very young in Palestine, which is equally true for the formal private sector in these countries. As a result, universities are often the strongest formal institutions in an entrepreneurial ecosystem, which is enabling entrepreneurial behaviour of individuals (Isenberg, 2010). They are relatively well-resourced and stable institutions that play a significant role in local development as sources of knowledge, skilled workforce, networks and business opportunities (Isenberg, 2010; Work Foundation, 2010; Stam, 2014; ACEEU, 2016b). Universities could thus be considered as ‘anchor institutions’ (Work Foundation, 2010) on which others can build.

In particular the example of Ethiopia shows the large impact of the foundation of a university, becoming the motor of economic development in the region. Although the Ethiopian universities cannot be labeled entrepreneurial, their mere existence has helped to create business and employment in and around the small regional towns in which they are located. As such the universities contribute to labour market opportunities for the local community as well as students and graduates. This has been the result of deliberate national government policy.

The situation in the complex setting of Palestine with a frustrated economy is different. This study has found that the universities play an important role in the political, cultural and social landscape of the country. They are innovatively able to cope with the many challenges of operating under Israeli occupation. Furthermore, they create significant direct and indirect employment in a setting of extremely high unemployment, but little evidence has been found on their wider economic impact. Only recently, the universities have started entrepreneurship activities and created business linkages with the ambition to help overcome the high youth unemployment. This new development, in combination with support by the international donor community and the important position that the universities in Palestine have, presumes that the universities will be able to increase their contribution to entrepreneurship and business development.

For Indonesia, with only one university assessed in this study, it is more difficult to make empirically supported statements on the role of (entrepreneurial) universities in society. Indonesia is a huge country, with more than 250 million inhabitants living on many islands. The education market is big and relatively open, with several thousands of public and primarily private higher education institutions. Furthermore, different than in Ethiopia and Palestine, the private and public sectors are large, diverse and well established. In this context, IPB can be seen as an example for other Indonesian universities. It is one of the leading national public universities that strategically reaches out to society. It is impacting on society through innovation and research, an extensive portfolio of community development activities, and a relatively high number of student start-ups. In addition, the university nourishes its vast alumni network with a variety of social activities. This alumni network is mentioned by many as one of the assets of the university, benefiting business and (self) employment of graduates. Thus, IPB's transformation towards a more entrepreneurial university in combination with the availability of a multitude of economic players is a fertile foundation for economic and business development.

Despite the differences among the universities and the three countries, this study has found that all the universities assessed are strongly engaged with society, but that they are weak in partnerships with private sector. Partnering for knowledge generation and – exchange is however a core aspect of an entrepreneurial university (Etzkowitz, 2004; Clark, 2004; Gibb,

2013), conceptualised in the Triple Helix model. Such a model of intertwined, intensive cooperation between universities, government and the formal private sector is a motor for innovation and economic development. In view of Etzkowitz (2004), entrepreneurial universities are by default part and parcel of a Triple Helix. In addition, engaging in partnerships is as well important for a well-functioning entrepreneurial ecosystem. Stam (2014) refers to the interaction of the elements that shape the ecosystem, like culture, infrastructure, market demand and formal institutions, but also leadership, knowledge, and talent[19].

But more is needed than engaging in and managing partnership. This study has made clear that it is an uphill battle for many universities in developing countries, characterised by a large informal economy, to partake in a well-functioning Triple Helix and to become entrepreneurial in the sense of commercialisation of innovative academic research. This is in particular true for those universities that are young and located far from where the economic action is. They focus on teaching, lack research capacities and resourceful networks (Stensaker and Benner, 2013), have limited options for engaging with the formal private sector, and operate in a weak or sometimes even hostile institutional entrepreneurial ecosystem (Alves, Fischer, Schaeffer, and Queiroz, 2019). These universities will have difficulty in playing a significant role in the global competitive academic world (Gibb, 2013) with its focus on innovative research.

Last, based on the findings of this study, one should refrain from claiming causal relations when answering the question on societal implications of becoming a more entrepreneurial university. A university is but one actor in an ecosystem, thus enterprising behaviour of its staff, students and graduates is also dependent on other elements of the system, like for instance the availability of government grants for student start-ups, as was the case in Indonesia. This has not been measured in this study. Another case in point is the substantial attribution to non-university related human capital variables of entrepreneurial lessons and skills learnt by the university-graduated nascent entrepreneurs as described in chapter five.

Summarising the answers on the three research questions leads to the following statements:

- The HEInnovate framework is valid as framework for assessing the entrepreneurial intent and activities of universities in developing countries. It is however less conducive for measuring entrepreneurial characteristics in a quantifiable, comparative manner, capturing a transformation process or relating developments within the university to the ecosystem in which it operates.

[19]These elements are different from the earlier analysed external factors that impact on how entrepreneurial a university is. These external factors were related to the university, whilst the elements of an ecosystem are impacting on entrepreneurial behaviour by individuals.

- Becoming a more entrepreneurial university is influenced by a multitude of internal and external and factors. The most important internal factors mentioned were: strategic intent, (exemplary) leadership, coordination and communication, research capabilities, and strength of social network. The external factors that were relevant for all the universities assessed are: institutional autonomy, funding, availability and maturity of formal private sector, and policy attention for youth (un)employment.
- From all these factors, a more entrepreneurial strategic intent, entrepreneurial leadership at the helmet of the institution, and institutional and individual autonomy went hand in hand. With these three enablers in place, a university seems to have the potential to engage in a process towards becoming more entrepreneurial.
- The more entrepreneurial universities were those in which exemplary leadership of the university president was able to sense and seize an external opportunity for the benefit of the university.
- The national economic situation seems to affect on how entrepreneurial a university is. The more entrepreneurial universities are located in countries with a higher national income.
- The older universities assessed seem to be more fit to become entrepreneurial than the younger universities, because of a more conducive working and learning environment, more experienced staff, more research capabilities, and a stronger and larger social network, including alumni.
- The more entrepreneurial universities seem to 'create' more entrepreneurial graduates who are better able to create a job or to find a job than graduates from less entrepreneurial universities: the universities assessed integrate entrepreneurial, twenty-first-century competencies and skills in the curriculum and offer a more conducive environment for students who want to start a business.
- Universities seem to play a supportive and accelerating role in entrepreneurship development of their students through support by entrepreneurial teaching staff, mentoring, and by giving access to finance and alumni.
- In the universities assessed, guiding students entrepreneurially is mainly dependent on a few individual teachers instead of purposefully organised by the university.
- Universities in developing countries are important socially, culturally, politically and economically. They can be considered pivotal formal institutions on which others can build, in particular when located further away from capital.
- All the universities assessed are strongly engaged with society, but are weak in partnerships with private sector.
- Many universities in developing countries are probably not ready for effective participation in a Triple Helix, because they lack research capacities and resourceful networks, and have limited options for engaging with the formal private sector.

Reflections and academic contributions

Several reflections and contributions to the academic debate can be made with respect to entrepreneurial universities.

First, this study contributes to the extant body of literature on entrepreneurial universities in the sense that the findings corroborate with the attention for the role of universities on stimulating entrepreneurial skills and – behaviour of students (Krabel, 2018; Marcondes de Moraes, Iizuka, and Pwedro, 2018). Even more, by extending the body of literature with a cross-country analysis of the entrepreneurial status of universities in a developing country context. In particular in such a context, employability of graduates appears to be an important imperative for a university to become more entrepreneurial. This study links the concept of entrepreneurial university with research on stimulating entrepreneurial intentions and – behaviour of students and graduates (Van der Sluis, Van Praag and Vijverberg, 2008; Martin et al., 2013; Rideout and Gray, 2013; Bae et al., 2014; Rauch and Hulsink, 2015).

Entrepreneurial intentions and – behaviour of students are strengthened through entrepreneurship education, of which many examples are mentioned in this dissertation. Entrepreneurship education is one of the aspects of an entrepreneurial university. This study demonstrates that the concept of entrepreneurship education is however ambiguous, used in two different meanings. First, as education with the sole purpose of preparing students to start-up a business. This interpretation is found at most of the universities assessed. The other meaning is of education aiming to strengthen entrepreneurial skills in a broader sense, from the view that these skills are relevant for all citizens, enabling them to create value whether self-employed or acting as an employee (Bacigalupo, Kampylis, Punie and Van den Brande, 2016).

It is argued that the second meaning of strengthening entrepreneurial attributes for all students with a focus on value creation needs more attention. In particular in developing countries where youth unemployment is a major issue, because stimulating self-employment is not the answer for the majority of the student population. Besides that the findings of this study point towards the limited relation between entrepreneurship education and immediate enterprise development of students, the majority of graduates globally will not become entrepreneur and will not create (many) jobs (GERA, 2018; ILO, 2018; OECD, 2019).

Another contribution to the academic debate is that this study demonstrates that the main characteristics of entrepreneurial universities in high-income countries as typified by Clark and Etzkowitz (Etzkowitz et al., 2017) seem to apply to universities in developing countries as well. The findings concur with the importance of independency in decision-making. Less attention has been given in this study on the need of all members of the university

to be involved and supportive to an entrepreneurial culture. Instead, the crucial role of the leadership at the top of the university has been exemplified. Last, the interaction with society as important characteristic is fully confirmed. However, instead of a focus on relations with businesses (Etzkowitz, 2004), the non-economic engaging role of the university is demonstrated to be present at universities in developing countries.

This study thus supports the societal role of entrepreneurial universities as stressed in literature (Subotzky, 1999; Saeed, Muffato and Yousaf, 2014; Sooampon and Igel, 2014; Amadi, Philips, Chodokufa and Visser, 2016; Grobbelaar and De Wet, 2016; Ceptureanu, 2017). Even more, the research findings have indicated the pivotal role universities in developing countries can play in the development of the environment in which they operate. Hence, it is suggested that other concepts than 'entrepreneurial university' may be more appropriate in a developing country context, in particular 'anchor institution' (Work Foundation, 2010), 'development university' (Grobbelaar and De Wet, 2016) or 'engaged university' (ACEEU, 2016b; Goddard and Kempton 2016).

Universities not only impact on the society in which they operate, but the other way round is true as well. This study confirms that a university is part of a bigger system, in which external factors impact on internal university developments. A more entrepreneurial university supporting students to become more entrepreneurial needs an enabling environment (Naudé, Szirmai and Goedhuys, 2011; Alves et al. 2019). This study emphasises political and legal support as well as a conducive economic context with mature governmental and private institutions.

A different reflection is that the concept of entrepreneurial university focuses on the university as a whole, whilst this study has indicated the importance of entrepreneurial teachers, mentors, social networking, and alumni for enterprise development. The interaction with students and among staff is getting shape on departmental level, within a centre, university farm, or other unit. This study has found that although these entrepreneurial interactions are amplified by a university-wide entrepreneurial strategy and entrepreneurial leadership, it is not a condition for individuals and entities to act entrepreneurially. Thus, entrepreneurial staff may operate in an institution that is not entrepreneurial. This is in line with Rasmussen, Mosey and Wright (2014) who concluded that departmental support for entrepreneurship is vital for the development of spin-offs, regardless of university level policies and practices.

Another contribution to the academic debate is the conclusion that the concept of entrepreneurial university is multi-dimensional. This study has demonstrated that one cannot sharply distinguish between entrepreneurial and non-entrepreneurial universities, and that any university can be entrepreneurial in more than one way. Being entrepreneurial is thus not a matter of yes or no, but a gradual process. Important dimensions according to this study and confirmed by literature are:

- Leadership and strategy: mission, vision, strategy, commitment and exemplary behaviour of university leadership (Vorley and Nelles, 2009; European Commission and OECD, 2012; Coyle et al., 2013; Gibb, 2013);
- Organisation: coordination, communication, integration of entrepreneurship related activities and programmes in education, research and community service (Nelles and Vorley, 2010; European Commission and OECD, 2013);
- Discretion: institutional independency, individual autonomy (Clark, 1998, 2004; Etzkowitz, 2004; European Commission and OECD, 2014);
- Staff capacities: experience, enterprising activities, staff development (European Commission and OECD, 2013; Fernández-Pérez et al., 2015);
- Entrepreneurship education: education and training for entrepreneurial skills development, mentoring, operational start-up support (European Commission and OECD, 2013);
- Research: joint research (Etzkowitz, 2004; Clark, 2004; Gibb, 2013);
- Cooperation with private sector: operational partnerships in education, research and community service (Etzkowitz, 2004);
- Networking: networking with a multitude of actors, alumni activities (Fernández-Pérez et al., 2015; Tang et al., 2016).

Next, there is a need to assess critically the applicability of the innovation-geared Triple Helix model in a developing context. The interrelation with industry and government, which is an intrinsic characteristic of entrepreneurial universities (Etzkowitz, 2004), is in developing countries hampered by many factors. These factors range according to this study from lack of capacities to absence of potential partner institutions. Acknowledging the influencing role of international donors as exemplified in the Palestinian study, it is suggested to introduce 'donor-pushed' as typology explaining stakeholder cooperation for economic development and innovation in a context in which government institutions are often weak, private sector is small, universities are young, under-resourced and focusing on teaching with weak research capabilities.

Furthermore, part of literature on entrepreneurial universities singles out entrepreneurship development as the so-called third mission of a university (Vorley and Nelles, 2009), besides education and research. This dissertation evidences the relevance of a holistic vision on universities in which leadership, governance, education, research and community services are together geared towards achieving the entrepreneurial agenda of the institution (Gibb, 2013; European Commission and OECD, 2014).

Last, this study has indicated that entrepreneurial features are nowadays common for any university, whether dominant in its strategy and operations, or present in a limited number of activities. It is part and parcel of a university to operate in an increasingly

entrepreneurial society (Audretsch, 2014), including in developing countries. One may conclude that 'entrepreneurial' as characteristic for a specific group of universities is not distinctive anymore, because all universities (try to) contribute in more or lesser extent to economic development through innovation, skilled and knowledgeable manpower, and consultancy. This conclusion is supported by the change of HEInnovate itself that has evolved in a framework that seems to include any feature that characterises a modern university. Furthermore, all universities operate nowadays in a dynamic context, hence this characteristic of an entrepreneurial university as defined by Gibb (2013) is also not a distinctive characterisation anymore.

However, if there is still a need for conceptualising entrepreneurial university, the following definition is suggested reflecting the results of this study. This definition puts more emphasis on supporting students to become entrepreneurial. In that sense, entrepreneurial university is different from a university operating as an enterprise contributing to innovation and business development through research (Etzkowitz, 2004), or a university that is innovative, able to adapt to changing needs of the society in which it operates (Gibb, 2013).

> *An entrepreneurial university is an independent academic organisation strategically geared towards contributing to economic development; with leadership at the top of the institution that 'walks the talk' and incentivises autonomous, entrepreneurial behaviour of staff and students; in which entrepreneurship related activities and programmes are interrelated with education, research and community service, and create added value to these other university activities; that has operational mutually beneficial partnerships with private sector, including in research; that supports networking; and stimulates business start-ups of students through a well promoted, operational support programme.*

Methodological reflections

Three interrelated methodological challenges impeded this study. First, the existing measurement systems of entrepreneurial universities (Clark, 1998; Etzkowitz, 2004; Kirby, 2006; Rothaermel, Agung, and Jiang, 2007; Guerrero and Urbano, 2012; European Commission and OECD, 2013; ACEEU, 2016) were mainly meant to assess a situation at a particular point of time and not to measure the results of an entrepreneurial transformation. This includes the HEInnovate framework as applied in this study. Second, no internationally agreed set of indicators exist to measure inputs, throughputs, outputs and outcomes of entrepreneurial universities, because of the variety of interpretations and manifestations of entrepreneurial university (Etzkowitz et al., 2017). Furthermore, those measurements that do exist are mostly perception-based. Perceptions are a reflection of reality, but not the reality per se. As a result, it was difficult to distinguish between entrepreneurial and non-entrepreneurial, and comparison among universities was seriously hampered.

For future research, it is important to overcome these methodological challenges, the more because university leaders, potential students, parents, policy makers but also researchers have the desire to compare universities globally and to substantiate the role of universities in society. An alternative approach would be to identify quantifiable output indicators. In search for indicators that could measure the implications of an entrepreneurial process at the university, four output indicators were tested in this study. The methodological conclusions that can be drawn from the use of these indicators are threefold. First, that the entrepreneurial status of a university cannot be measured by one single indicator. Each indicator only relates to one of the variables of the entrepreneurial university framework, like leadership or entrepreneurship education. Entrepreneurial university is multi-dimensional as explained above. Even more, different, possibly opposing conclusions on the entrepreneurial status of a university could be drawn for the same university using another output indicator. These problems could be solved by presenting results per dimension in a spiderweb. In that manner, it is possible to visualise in which dimension a university is more entrepreneurial than the other.

Secondly, attribution of outputs – like the number of start-ups - to intended university strategies and activities is difficult. Although the empirical findings of this dissertation indicate that students and graduates from the most entrepreneurial university assessed have created more start-ups, generalising and substantiating the form of this relation needs additional research. A regression analysis would be appropriate to estimate the relation between output indicators (the dependent variables) and what the university is offering, like funding, mentorship, and resources, or external factors like government policies (the independent variables), under the condition that all variables have a ratio scale. Thirdly, interpretation of outputs appeared to be context specific. For instance, the budget generated by the university for contract research (as output indicator for collaboration with business) might be related to the availability and maturity of formal private sector (which has been found in this study as a relevant external factor) or to conducive government regulations.

Concerning capturing change over time as mentioned above, the methods used in this study were appropriate for answering the research questions, in particular on what explains the entrepreneurial status of a university. In case research would primarily focus on analysing the process of university transformation, a longitudinal approach would be needed covering a period of several years.

Relating these methodological reflections and earlier mentioned limitations to the HEInnovate framework as tested in this research, several suggestions for modification of this framework can be made when applied in a developing country context. First, when the objective is to describe the entrepreneurial status of a university, HEInnovate is appropriate. It would however be important to add explicit attention for the conduciveness

of the university campus for teaching and learning. In addition, it should look more into the non-economic societal role of the university and into relations with the informal private sector, which is in many countries far bigger than the formal private sector. When the objective is to analyse and measure the entrepreneurial status of a university in a comparable manner at any time or place, it is foremost important to restrict the number of variables. This would ease data collection and – analysis. In addition, per category of the framework a restrictive number of quantitative, normative indicators should be identified, complimenting or replacing the perception-based studies. Furthermore, in order to be able to study interrelations, HEInnovate should be complimented with a model linking inputs, throughput, outputs and impacts.

Last, in this study no hypotheses were formulated about the entrepreneurial status of universities in developing countries. This can be explained because the research in first instance focused on how to measure the entrepreneurial status (research question 1). About five years ago, at the start of this study, the HEInnovate framework was still new and only applied at universities in OECD member states. Little information was available on entrepreneurial universities in developing countries. Thus, testing the framework in a developing country context was initially more important than identifying which variables of the framework would be more important than others. In Indonesia, Ethiopia and Palestine, the HEInnovate framework was validated. For follow-up research, the above formulated answers on the second and third research question give direction to possible hypotheses.

Policy and practical contributions

The results of the four empirical studies include several important contributions for university leaders and policy makers. These studies collectively have learnt that the question 'How entrepreneurial are universities in developing countries' cannot be easily answered. The entrepreneurial status of a university cannot be measured by a single indicator, and universities follow different paths of development. All universities perform entrepreneurial or entrepreneurship development activities, but that does not yet make them entrepreneurial in the sense of strategic intent and organisational set-up (Sam and Sijde, 2014). Policy makers and researchers should think twice before investing in developing indices on entrepreneurial universities, like the one in Turkey (Gür, Sinemden and Özlem, 2017) or Brazil (Almeida, Plonski, Axelberg, Baeta, Terra and Simõeset, 2018), because it will need complex data collection, combining qualitative and quantitative indicators, and because the complexity of a university cannot be captured in one number.

This study has demonstrated that universities increasingly seek to contribute to entrepreneurial behaviour of their students and graduates through entrepreneurship education. The results are mixed, but indicating that universities may support the initiation

of start-ups through investing in entrepreneurial staff, mentoring, involving alumni and giving access to finance. In countries with high youth unemployment, like Palestine, any start-up created is worthwhile from the perspective of self-employment, and as such important to be supported. However, policy makers, funders and university leaders should be careful in expecting too much of universities. Only a limited number of university-educated graduates may start a business and contribution of these start-ups to economic development and job creation is in most cases very modest (Shane, 2009; Block, Fisch and Van Praag, 2018). The current focus on entrepreneurship education for business creation leads to too high expectations.

Furthermore, we can conclude that most of the universities need to step-up their programmes in support of developing entrepreneurial teaching and learning as a way to contribute to the employability of their graduates and as such help mitigating youth unemployment. From this perspective, it is important to invest in staff development, in particular on entrepreneurial teaching, and to facilitate staff time and capacities to act as mentor (Fernández-Pérez et al., 2015). The policy recommendation would thus be to move away from incentivising staff to become entrepreneur themselves towards incentivising staff to be able to teach and demonstrate entrepreneurial, twenty-first century skills to their students. In order to teach students to grasp opportunities and to help grow their social network. This would not only benefit students who aspire to start-up a business, but all students. A concerted, strategic effort by the university would be needed, differently than being dependent on the actions of individual staff members, the latter which is the case at most of the universities assessed in this study.

Beyond the need to stimulate enterprising behaviour of staff and to improve entrepreneurial teaching and learning as explained above, this study indicates that initiatives aiming at countering labour market mismatches of university graduates should have a broader, institutional approach. Initiatives by universities to stimulate entrepreneurial teaching and learning and support to entrepreneurs are expected to be more succesful when embedded in an entrepreneurial university strategy, supported by (exemplary) leadership, good internal coordination and communication, stronger research capabilities that open opportunities for partnering with private sector, and a strong social network.

Another policy conclusion relates to the interaction of universities with government and industry. In particular partnerships with private sector are weak. There is a need to increase capacities of university leadership and staff to partner with a multitude of stakeholders. This will strengthen the foundation for economic development in the locality in which the university operates and will benefit students and graduates in their search for (self) employment.

In the understanding that it is difficult for many universities in developing countries to participate in an innovation-geared Triple Helix as explained above, a diversification policy could be recommended with different expectations and targets for different universities. Young teaching universities could be supported to intensify their efforts on entrepreneurship education as explained above, helping to overcome skill mismatches. Having the right skills is key for young people to grasp opportunities that may lead them out of informality. Universities could be stimulated to create a learning environment conducive for experimentation and creativity. In addition, they could be developing applied research capacities on frugal innovation in support of small and medium sized entrepreneurship. Whilst those universities located in the proximity of a stronger economic cluster (Porter, 2014) with a stronger (emerging) private sector, could be supported to generate and commercialise innovative research through among others strengthening Triple Helix partnerships. In many developing countries, these universities are the oldest universities, often located in the capital.

Setting targets and expressing expectations to universities immediately touches upon the relation between universities and the (national) government. Globally this relation is a sensitive one: in general, governments want to have control of the education system because it is considered to be important in shaping the future of a nation, whether socially, culturally or economically. Universities, with their leaders, staff and students, want to be free to take their own decisions. This dissertation has evidenced that one can better grant universities institutional discretion if these universities are tasked to stimulate entrepreneurship.

Last, in many developing countries, international donor agencies play an important role in setting or influencing policy agendas. This has been explained in the case of Palestine, in which the attention for entrepreneurship development has been actively pushed by donors. However, if student employability is the policy objective, then donor programmes that are solely focusing on student start-up development will only partially be the solution. It is recommended that the donor community undertakes a coordinated effort to stimulate the integration of entrepreneurial, twenty-first-century competencies and skills in the curriculum, to strengthen the entrepreneurial and partnership capacities of teaching staff, to continue with their support to management and leadership of universities, and to stimulate institutional partnerships between universities and the formal private sector. This study has demonstrated that it is important to support universities in developing countries given their role as engines for change in a context in which other institutions are often weak or absent.

Implications for future research

In addition to the suggestions for further research as mentioned in the four empirical studies, a few cross-cutting final implications for further research can be indicated. First, the

academic and methodological reflections above pinpoint to the need to develop and test a set of quantifiable indicators for entrepreneurial university. Possible indicators are collected in this study.

Second, this study has concluded that universities in developing countries are pivotal in the entrepreneurial ecosystem, and can be in many cases considered as 'anchor institutions'. But more research would be needed to identify what role universities play more concretely. How best could an entrepreneurial ecosystem be improved making use of the relative strengths of universities? This directly relates to the need to better understand the impact of entrepreneurial universities on socio-economic development, which is also the main recommendation of the recent review of Dutch higher education institutions (OECD and European Commission, 2018). Such research may be methodologically complicated but important, because statements on impact are too often grounded on wishful thinking, more than facts.

Third, this dissertation has shown that cross-country comparison is difficult because factors that impede or support entrepreneurial university transformation may differ. Each country has its entrepreneurial ecosystem in which universities are a part, or in other words country specific institutional frameworks that affect national entrepreneurship processes (Ács, Autio and Szerb, 2014). Despite this understanding, further research is recommended into the internal and external factors that according to this study influence entrepreneurial university transformation. Are these factors valid globally? And which factors are the determining ones under which conditions?

This leads to the country selection of this dissertation. Three different countries were selected, geographically distinct and with a different economic outlook. This resulted in a wealth of information but also has limited the comparison of these data. It is a logical step to do a second study that could deepen the conclusions of this one, focusing on one country only and on one or two dimensions of entrepreneurial university.

Last, this study only sporadically touched upon culture as aspect of entrepreneurial university transformation. The Ethiopian study concluded that a strong will to change was missing at the universities assessed, whilst the leadership at the Indonesian university worked consistently to create a more entrepreneurial culture. Organisational culture is considered a relevant factor influencing how entrepreneurial an organisation is (Clark, 2004; Kirby, 2006; Nelles and Vorley, 2010; Fayolle and Redford, 2014). Culture is also one of the elements of an entrepreneurial ecosystem (Stam, 2014). It is thus recommended to carry out further research into this area.

Final remarks

More than being entrepreneurial, this research has demonstrated that universities in Ethiopia, Indonesia and Palestine are in the midst of society, engaged with societal needs. Community development is a normal aspect of all these universities, and has found to be compulsory for teaching staff and students in Indonesia and Ethiopia. This coincides with the attention for social entrepreneurship in these countries. This is different from many universities in the Western world in which economic valorisation prevails as an add-on to education and research. Policy makers and university leaders in developing countries could learn from their colleagues in developed countries how to incorporate economic aspects in community development. And the other way round: policy makers and university leaders in developed countries could learn from their colleagues in developing countries how to structurally embed community service in education and research.

I would like to conclude with a personal note. In the preface of this dissertation, I mention my sincere interest for other human beings and their social interplay, in particular in other cultures. This study has taught me that at the end of the day it are the people who make the universities. Inspirational leadership matters and social networking is vital. Entrepreneurship and youth employment need universities in which leadership, staff and students can grow, intellectually as well as socially.

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Summary

This dissertation is about universities in developing countries. It is about how universities contribute to the region in which they operate, and in particular on how they prepare students for (self-)employment through among others entrepreneurship development.

I am very much interested in other cultures: the further away, the more I seem to be fascinated. I also want to understand how people interact with each other, because I believe that we can achieve more through cooperation. In my life and work, I try to bring people together and to empower them. I am inspired by questions on how organisations could contribute to social development and be managed in such a way that everyone performs best to his or her abilities and interests. This all comes together in my work at MSM as manager of several projects in support of higher education institutes in developing countries and emerging economies. Central to these projects is strengthening the relevance of the respective universities for the socio-economic development of their countries. This is where the notion of entrepreneurial university comes in and this study started.

The major research question that this study meant to answer, was 'How entrepreneurial are universities in developing countries?' and the secondary research questions were (i) 'How can we measure the entrepreneurial intent and activities of universities in developing countries?' (ii) 'Which factors influence how entrepreneurial a university is?' and (iii) 'What have been the implications of becoming a more entrepreneurial university on society?'. Entrepreneurial university is defined as an academic organisation designed for staff and students to become entrepreneurial, innovative, and creative, and - in partnership with many stakeholders - create public value, operating in a dynamic context (Gibb, 2013).

In a multiple-case study, I have assessed 14 universities: one in Indonesia, nine in Ethiopia and four in Palestine. In addition, 14 entrepreneurs who graduated from a university in Ethiopia or Indonesia were interviewed to explore whether they attributed their entrepreneurial behaviour to characteristics of their universities. The findings of these four empirical studies (on Indonesia, Ethiopia, Palestine, and on nascent entrepreneurs) are described in four research chapters.

The overall conclusion is that at all 14 universities assessed, entrepreneurial activities were taking place, in particular entrepreneurship education. However, only the Indonesian university (the Agricultural University Bogor, IPB, see chapter two), situated in a middle-income country, could be categorised as entrepreneurial, because of its strategically embedded research-based technology transfer and innovation. This development was triggered by the granting of the autonomy status of the university by the government of Indonesia in combination with a serious threat of drastically reduced government funding.

The institutional leadership consistently worked towards becoming a research-based entrepreneurial university, stimulating technology transfer and innovation.

Nine Ethiopian universities have been assessed (chapter three) showing little variation. All were operating in a top-down, central government-led context, in which the Ministry of Education among others had instructed the universities to strengthen entrepreneurial mindsets of the students. The universities faced limited discretion: university leaders had to obey the instructions from the central government and staff had the inclination to act on command. Entrepreneurship education was being set up, but in general, there was a lack of an entrepreneurial vision, mission, and strategy. Partnering with external stakeholders was limited. Some of the universities showed more entrepreneurial activities than other universities, which coincided with a positive orientation of institutional leadership towards entrepreneurial initiatives. The study concluded that it is questionable whether the universities were effectively contributing to creating young, entrepreneurial Ethiopians with the right skillset to find (self-)employment and help boosting the economy.

In Palestine, more specifically in the West Bank, the four universities assessed demonstrated an entrepreneurial zeal (chapter four). In their diversity, they all set-up activities to strengthen entrepreneurial attributes of their students and to link education with industry. A strong push factor identified in this research was the prominent influence of international donor agencies that made funds available for conquering the huge problem of youth employment in the country: the unemployment rate is above 40 per cent (ILO, 2016). This study concluded that the Palestinian universities were good examples of socially and culturally engaged universities (Goddard and Kempton, 2016) more than being entrepreneurial. Furthermore, it concluded that the notion of an entrepreneurial university as an important contributor to innovation through research often does not apply in a developing context.

The final research chapter of this dissertation (chapter five), on university-graduated nascent entrepreneurs in Ethiopia and Indonesia, resulted in the indicative conclusion that entrepreneurial universities may play a supportive and accelerating role in entrepreneurship development of their students. They could do so through support by entrepreneurial teaching staff, mentoring, and by helping to give access to finance and alumni. However, this study also pointed to the limitations of the role of universities: the relation between entrepreneurial education and entrepreneurial behaviour of graduates seems to be limited and in most of the cases, university-educated entrepreneurs only started a business after several years of work experience after their graduation.

The four research studies combined lead to the crosscutting observations that all universities assessed are strongly engaged with society, have a growing but limited cooperation with the formal private sector, and that entrepreneurship education is on the rise. Furthermore,

all universities assessed in which more entrepreneurial activities were taken place were administered by a university leadership at the top of the institution that demonstrated a positive attitude and active support towards entrepreneurship development and new initiatives.

Summarising the answers on the three research questions leads to the following conclusions:

- Becoming a more entrepreneurial university is influenced by a multitude of internal and external and factors. The most important internal factors mentioned were: strategic intent, (exemplary) leadership, coordination and communication, research capabilities, and strength of social network. The external factors that were relevant for all the universities assessed are: institutional autonomy, funding, availability and maturity of formal private sector, and policy attention for youth (un)employment.
- From all these factors, a more entrepreneurial strategic intent, entrepreneurial leadership at the helmet of the institution, and institutional and individual autonomy went hand in hand. With these three enablers in place, a university seems to have the potential to engage in a process towards becoming more entrepreneurial.
- The more entrepreneurial universities were those in which exemplary leadership of the university president was able to sense and seize an external opportunity for the benefit of the university.
- The national economic situation seems to affect on how entrepreneurial a university is. The more entrepreneurial universities are located in countries with a higher national income.
- The older universities assessed seem to be more fit to become entrepreneurial than the younger universities, because of a more conducive working and learning environment, more experienced staff, more research capabilities, and a stronger and larger social network, including alumni.
- The more entrepreneurial universities seem to 'create' more entrepreneurial graduates who are better able to create a job or to find a job than graduates from less entrepreneurial universities: the universities assessed integrate entrepreneurial, twenty-first-century competencies and skills in the curriculum and offer a more conducive environment for students who want to start a business.
- Universities seem to play a supportive and accelerating role in entrepreneurship development of their students through support by entrepreneurial teaching staff, mentoring, and by giving access to finance and alumni.
- In the universities assessed, guiding students entrepreneurially is mainly dependent on a few individual teachers instead of purposefully organised by the university.
- Universities in developing countries are important socially, culturally, politically and economically. They can be considered pivotal formal institutions on which others can build, in particular when located further away from capital.

- All the universities assessed are strongly engaged with society, but are weak in partnerships with private sector.
- Many universities in developing countries are probably not ready for effective participation in a Triple Helix, because they lack research capacities and resourceful networks, and have limited options for engaging with the formal private sector.

HEInnovate

In this study, I tested the applicability of HEInnovate. This self-assessment framework developed by the OECD and the European Commission (European Commission and OECD, 2013) was proven to be valid as framework for assessing the entrepreneurial intent and activities of universities in developing countries. It would however be important to add explicit attention for the conduciveness of the university campus for teaching and learning. In addition, it should look more into the non-economic societal role of the university and into relations with the informal private sector. Furthermore, I conclude that HEInnovate is less conducive for measuring entrepreneurial characteristics in a quantifiable, comparative manner, capturing a transformation process or relating developments within the university to the ecosystem in which it operates. Last, I suggest that HEInnovate should be complimented by a model that would link inputs, throughput, outputs and impacts of an entrepreneurial university.

Academic contributions

The findings of this study corroborate with the attention in literature for the role of entrepreneurial universities in stimulating entrepreneurial skills and – behaviour of students (Krabel, 2018; Marcondes de Moraes, Iizuka, and Pwedro, 2018), among others through entrepreneurship education. Evenmore, this study extends the body of literature with a cross-country analysis of the entrepreneurial status of universities in a developing country context. In particular in such a context, employability of graduates appears to be an important imperative for a university to become more entrepreneurial.

In addition, this study has demonstrated that the concept of entrepreneurial university is multi-dimensional. One cannot sharply distinguish between entrepreneurial and non-entrepreneurial universities. Being entrepreneurial is a gradual process. Important dimensions are: leadership and strategy; organisation, coordination and communication; institutional and individual autonomy; staff capacities; entrepreneurship education; joint research; cooperation with private sector; and networking activities.

Furthermore, this study has demonstrated the importance of entrepreneurial teachers, mentors, social networking, and alumni for enterprise development. In this study I found that although these entrepreneurial interactions are amplified by a university-wide entrepreneurial strategy and entrepreneurial leadership, it is not a condition for individuals

and entities to act entrepreneurially. Thus, entrepreneurial staff may operate in an institution that is not entrepreneurial.

Another contribution to the academic debate is that this study demonstrates that the main characteristics of entrepreneurial universities in high-income countries as typified by Clark and Etzkowitz (Etzkowitz et al., 2017) seem to apply to universities in developing countries as well. However, instead of a focus on relations with businesses (Etzkowitz, 2004), the non-economic engaging role of the university is demonstrated to be more prominent.

This study thus supports the societal role of entrepreneurial universities as stressed in literature (Subotzky, 1999; Saeed, Muffato and Yousaf, 2014; Sooampon and Igel, 2014; Amadi, Philips, Chodokufa and Visser, 2016; Grobbelaar and De Wet, 2016; Ceptureanu, 2017). Even more, the research findings have indicated the pivotal role universities in developing countries can play in the development of the environment in which they operate. I suggest that other concepts than 'entrepreneurial university' may be more appropriate in a developing country context, in particular 'anchor institution' (Work Foundation, 2010), 'development university' (Grobbelaar and De Wet, 2016) or 'engaged university' (ACEEU, 2016b; Goddard and Kempton 2016).

Universities not only impact on the society in which they operate, but the other way round is true as well. This study confirms that a university is part of a bigger system, in which external factors impact on internal university developments. A more entrepreneurial university supporting students to become more entrepreneurial needs an enabling environment (Naudé, Szirmai and Goedhuys, 2011; Alves et al. 2019).

Last, I argue to critically assess the applicability of the innovation-geared Triple Helix model in a developing country context. The interrelation with industry and government, which is an intrinsic characteristic of entrepreneurial universities (Etzkowitz, 2004), is in developing countries hampered by many factors. Acknowledging the influencing role of international donors, I suggest introducing 'donor-pushed' as typology explaining stakeholder cooperation for economic development and innovation in a context in which government institutions are often weak, private sector is small, universities are young, under-resourced and focusing on teaching with weak research capabilities.

Policy contributions

This dissertation concludes with several policy recommendations. First, I have demonstrated that universities increasingly seek to contribute to entrepreneurial behaviour of their students and graduates through entrepreneurship education. Universities may support the initiation of start-ups through investing in entrepreneurial staff, mentoring, involving alumni and giving access to finance. In countries with high youth unemployment, any start-

up created is worthwhile from the perspective of self-employment, and as such important to be supported.

In addition, I recommend to give more attention to strengthening entrepreneurial skills in a broader sense. These skills are relevant for all citizens, enabling them to create value whether self-employed or acting as an employee. Universities need to invest in staff development, in particular on entrepreneurial teaching, and to facilitate staff time and capacities to act as mentor. I recommend to move away from incentivising staff to become entrepreneur themselves towards incentivising staff to be able to teach and demonstrate entrepreneurial, twenty-first century skills to their students.

Furthermore, initiatives aiming at countering labour market mismatches of university graduates should have a broad, institutional approach. Initiatives by universities to stimulate entrepreneurial teaching and learning and support to entrepreneurs are expected to be more succesful when embedded in an entrepreneurial university strategy, supported by (exemplary) leadership, good internal coordination and communication, stronger research capabilities that open opportunities for partnering with private sector, and a strong social network.

Another policy conclusion relates to the interaction of universities with government and industry. I propose to increase capacities of university leadership and staff to partner with a multitude of stakeholders. This will strengthen the foundation for economic development in the locality in which the university operates and will benefit students and graduates in their search for (self) employment.

This study has made clear that it is an uphill battle for many universities in developing countries, characterised by a large informal economy, to partake in a well-functioning Triple Helix and to become entrepreneurial in the sense of commercialisation of innovative academic research. I recommend to support young teaching universities to intensify their efforts on entrepreneurship education and to create a learning environment that is conducive for experimentation and creativity. In addition, they could be developing applied research capacities on frugal innovation in support of small and medium sized entrepreneurship. Whilst those universities located in the proximity of a stronger economic cluster with a stronger (emerging) private sector, could be supported to generate and commercialise innovative research through among others strengthening Triple Helix partnerships. In many developing countries, these universities are the oldest universities, often located in capital.

In many developing countries, international donor agencies play an important role in setting or influencing policy agendas. I recommend that the donor community undertakes a coordinated effort to stimulate the integration of entrepreneurial, twenty-first-century

competencies and skills in the curriculum, to strengthen the entrepreneurial and partnership capacities of teaching staff, to continue with their support to management and leadership of universities, and to stimulate partnerships between universities and the formal private sector.

Last, this dissertation has demonstrated that universities in a developing context are often the strongest formal institutions in an entrepreneurial ecosystem. They are relatively well-resourced and stable institutions that play a significant role in local development as sources of knowledge, skilled workforce, networks and business opportunities. They are in the midst of society, trying their best to contribute to entrepreneurship development and youth employment.

This bring me to the end of this summary. Years ago, when studying sociology, I was learning about social interactions. Now, 30 years later, this PhD study brings me back to the importance of social relations. This study about universities was in fact about people: about students, graduates, teachers, university administration. About people who in their own way try to make the best out of their lives: for themselves, for others, and – whether consciously or not – for the development of their country. It is important for the leadership of universities, staff and students to create, strengthen and utilise social networks. This is a fruitful foundation for the development of entrepreneurship and employment in Ethiopia, Indonesia and Palestine.

In het kort

Universiteiten in het midden van de samenleving:
ondernemerschap en jeugdwerkgelegenheid in Ethiopië, Indonesië en de Palestijnse Gebieden

Mijn onderzoek gaat over universiteiten in ontwikkelingslanden, in Ethiopië, Indonesië en de Palestijnse Gebieden, maar eigenlijk gaat het over mensen. Over studenten, afgestudeerden, docenten, afdelingshoofden, leidinggevenden. Over mensen die ieder op hun eigen manier er het beste van willen maken: voor zichzelf, voor anderen en zich al dan niet heel bewust inzetten voor de ontwikkeling van hun land.

Ik heb een diepgewortelde interesse in andere culturen: hoe verder weg, hoe boeiender ik het lijk te vinden. Ook wil ik snappen hoe mensen met elkaar omgaan, vanuit het geloof dat door samen te werken we meer voor elkaar kunnen krijgen. Ik probeer in mijn doen en laten mensen bij elkaar te brengen en in hun kracht te zetten. Dat heeft zich vertaald in mijn inzet voor maatschappelijke organisaties. Ik word geïnspireerd door vraagstukken over hoe organisaties zich beter kunnen inzetten voor maatschappelijke ontwikkeling en zich zo kunnen organiseren dat iedereen tot zijn of haar recht komt.

Deze drijfveren hebben me gebracht bij Maastricht School of Management (MSM). In mijn werk bij MSM heb ik de kans om met heel veel mensen in verschillende culturen mijn steentje bij te dragen aan het versterken van organisaties. Daarmee help ik – hopelijk - de sociaal economische situatie van die landen te verbeteren.

Dat is de opmaat naar mijn promotieonderzoek waarin ik heb gekeken naar de rol die universiteiten in Ethiopië, Indonesië en de Palestijnse Gebieden spelen in hun land.

Die rol is groot. Zeker in een context waar andere organisaties zwak zijn en de afstanden naar het politieke en economische centrum van het land letterlijk groot zijn, zijn universiteiten zogenaamde ‘anker instituties’. Het zijn organisaties waarop anderen kunnen bouwen. Ze spelen een centrale rol in het sociale, culturele, economische en politieke leven.

Ik heb gekeken naar de rol van universiteiten bij het bevorderen van ondernemerschap en werkgelegenheid onder jongeren. Waarom? Omdat in Ethiopië, Indonesië en de Palestijnse Gebieden ongeveer 65 procent van de bevolking jonger dan 25 jaar is en de jeugdwerkloosheid hoog is. In Palestina zelfs meer dan 40 procent. In die context besteden internationale financiers en overheden veel aandacht aan het bevorderen van ondernemerschap. Ze doen dit omdat ze verwachten dat dit een belangrijke oplossing is voor de jeugdwerkloosheid

en kan helpen om de economie te laten groeien. Wat doen universiteiten en helpt dat ook daadwerkelijk?

Universiteiten kunnen een kataliserende functie hebben: studenten die al interesse hebben in ondernemerschap kunnen hierin worden gestimuleerd en geholpen. Dat kan bijvoorbeeld met de inzet van ondernemende docenten, het organiseren van mentorschap en toegang te geven tot financiën en het netwerk van alumni. Die laatsten blijken te helpen op veel manieren: met advies, geld, contacten en soms met goedkope bedrijfsruimtes.
Maar de bijdrage van universiteiten aan ondernemerschap en het creëren van banen moet niet overschat worden. De meeste studenten zullen nooit een bedrijfje starten, de meeste bedrijfjes creëren weinig banen en heel vaak onstaan bedrijven pas een hele tijd nadat iemand is afgestudeerd, nadat werkervaring is opgedaan. Ook blijken ondernemers veel geleerd te hebben van mensen en ervaringen buiten hun studie.

Dat brengt me tot de volgende conclusies. In universiteiten is meer aandacht nodig voor het aanleren bij alle studenten van ondernemerschapsvaardigheden. De reden hiervoor is dat die vaardigheden – dan hebben we het over het durven nemen van risico's en besluiten, het herkennen en aanpakken van mogelijkheden, het netwerken, het leren onderhandelen – van belang zijn voor elke afgestudeerde. En juist op dit punt gebeurt er in Ethiopië, Indonesië en de Palestijnse Gebieden nog te weinig. Dat komt omdat de focus te veel ligt op studenten stimuleren een bedrijfje op te starten.

De belangrijkste personen binnen de universiteit die hiervoor kunnen zorgen zijn de docenten, en juist zij hebben in Ethiopië, Indonesië en Palestina nog weinig ervaring met het overbrengen van ondernemerschapsvaardigheden. Ik concludeer dat er meer aandacht moet komen voor versterken van capaciteiten van de docenten. Zodat ze zelf ondernemender worden als voorbeeld voor hun studenten, zodat ze ondernemerschapsvaardigheden kunnen integreren in hun onderwijs, zodat ze kunnen optreden als mentor, kunnen netwerken en hun netwerken kunnen inzetten voor hun studenten. Relaties aangaan en onderhouden – vooral met het bedrijfsleven. Dit gebeurt nog te weinig door docenten en hun leidinggevenden in Ethiopië, Indonesië en de Palestijnse Gebieden.

Mijn onderzoek laat zien dat in de ene universiteit er meer aandacht is voor het bevorderen van ondernemende docenten en studenten dan in de andere. Universiteiten die in samenspel met overheid en bedrijfsleven beleid uitvoeren dat is gericht op het stimuleren van ondernemend gedrag van medewerkers en studenten, maar ook de afgestudeerden, noemen we ondernemende universiteiten. Van de 14 onderzochte universiteiten verdient alleen IPB University in Indonesië dat label. De leiding van IPB heeft al bijna 20 jaar geleden een koers uitgezet naar marktgericht onderzoek en het bevorderen van ondernemende

studenten. Dat heeft er toe geleid dat er relatief veel afgestudeerden een bedrijfje zijn gestart en de universiteit is beloond vanwege de inzet voor innovatie.

Maar wat maakt dan dat de ene universiteit meer ondernemend is dan de andere? Een aantal factoren zijn van belang, maar drie factoren sprongen eruit in de analyse. Het is essentieel dat de hoogste functionaris (voorzitter van het bestuur, of de rector) zich actief inzet voor ondernemerschap en kansen voor de universiteiten herkent en pakt. Deze persoon moet in zijn of haar doen en laten een voorbeeld zijn voor anderen. Dat leiderschap van de hoogste baas doet er toe. Tenslotte moet de universiteit een visie en strategie hebben die aandacht schenkt aan ondernemerschap en moeten de universiteit en de medewerkers een grote mate van onafhankelijkheid hebben om deze strategie naar eigen inzicht vorm te geven en uit te voeren.

Ook de omgeving is van belang, zoals de aanwezigheid van een sterk bedrijfsleven en een stimulerend overheidsbeleid met goed functionerende overheidsinstellingen. Daar ontbreekt het in veel ontwikkelingslanden vaak aan, vooral in Ethiopië en Palestina in dit onderzoek. Het is voor veel universiteiten in ontwikkelingslanden moeilijk om echt samen op te trekken met de overheid en het bedrijfsleven, iets wat in de westerse wereld veel gebruikelijker is en wat hoort bij een ondernemende universiteit. Dat komt ook omdat docenten en leidinggevenden niet zo weten hoe dat te doen. Daarom is het belangrijk om te investeren in het ecosysteem waar de universiteit deel van uit maakt en om universiteiten te helpen om relaties aan te gaan met andere economische partijen.

Er is geen duidelijk onderscheid te maken tussen wat nu wel of niet een ondernemende universiteit is. Het verschil is gradueel en meetbaar op verschillende dimensies. Er is ook geen simpele formule hoe ondernemende universiteit te worden. Een universiteit kan ondernemend zijn op het ene gebied en minder op het andere. Die gebieden heb ik wel duidelijker gekregen. Ik kom tot acht dimensies die van belang zijn. Dat zijn ten eerste leiderschap en de strategie van de universiteit. Ten tweede hoe de universiteit is georganiseerd, en vooral hoe ondernemerschapsactiviteiten worden gecoördineerd en geïntegreerd in onderwijs, onderzoek en inzet voor de lokale gemeenschap. Ten derde moeten de universiteit en de medewerkers handelingsvrijheid hebben. Ten vierde is aandacht voor de ontwikkeling van ondernemerschapsvaardigheden van de docenten belangrijk. Ten vijfde wat er gebeurt aan ondernemerschapsonderwijs, zowel gericht op het stimuleren van nieuwe bedrijven door studenten en afgestudeerden als op het aanleren van ondernemerschapsvaardigheden. Ten zesde is het belangrijk dat universiteiten samen met een externe partij werken, zoals bijvoorbeeld voor of met een bedrijf onderzoek doen. Ten slotte is het belangrijk dat er ook echt wat samen gedaan wordt, in onderwijs, onderzoek, of voor de lokale gemeenschap en dat de universiteit zorgt dat er veel samenwerking is met

allerhande externe relaties en dat daarbij zeker aandacht besteed wordt aan relaties met alumni.

Dat brengt me aan het einde van deze samenvatting. Jaren terug, als student sociologie, hield ik me al bezig met sociale interacties. Nu 30 jaar later, leidt mijn promotieonderzoek me weer terug naar het belang van sociale relaties.

Het is belangrijk dat de universiteitsleiding, docenten en studenten actief sociale netwerken creëren, versterken en inzetten, vooral met het bedrijfsleven en met alumni. Daarmee wordt een vruchtbare bodem gelegd voor de ontwikkeling van ondernemerschap en van werkgelegenheid in Ethiopië, Indonesië en de Palestijnse Gebieden.

Huub Mudde, Maastricht, februari 2020

Biography

Huub Mudde (Hubertus Leo Marie) holds a MSc. in Sociology from Wageningen Agricultural University, the Netherlands. He did his doctoral research at School of Business and Economics of Maastricht University.

Huub (born in 1964) has worked his full professional life in international cooperation: at the Ministry of Foreign Affairs of the Netherlands, SNV Netherlands Development Organisation, Europe's Forum on International Cooperation, as a consultant, and as of 2007 at Maastricht School of Management (MSM). At MSM, he is currently Senior Project Consultant and Lecturer Institutional Entrepreneurship.

Huub is a networker pur sang. He likes working with people the most, illustrated by his experience as dialogue facilitator and his professional interest in multi-stakeholder cooperation. In this work, he acts as knowledgeable process facilitator. Huub has a positive view on the world, a broad interest, and is energetic and persistent with an eye for details.

Huub has vast experience in designing, managing and directing complex multi-year projects in several countries in Africa, Asia, Central Europe and the Middle East. Almost all projects and programmes that Huub is and has been managing are with and for educational institutions. Expertise areas are leadership, management, multi-stakeholder partnership, entrepreneurship and agricultural development. A specific focus in many of these projects is the work on female talent development and women empowerment.

Before working for MSM, Huub was several years consultant on fund raising, dialogue, strategic communication, and vision development for organisations working in the area of international relations. At that time, he set-up and ran successfully Maastricht Debates, which was a series of public debates on globalisation and development. About 30 debates have been organised over a period of four years. As a spin-off, Huub co-founded Sphinx, the local debating centre of Maastricht.

The reason why Huub moved in 1998 to Maastricht was to become coordinator of Euforic, Europe's Forum on International Cooperation. Euforic was a web-based platform on which latest information on Europe's development policy and practice was published. Before moving to Maastricht, Huub worked in The Hague where he started his professional career. First at the Information Department of SNV Netherlands Development Organisation where he became acting head. Subsequently, he worked at the Information Department of the Dutch Ministry of Foreign Affairs.

Huub is married to Mattanja Coehoorn with whom he has three children: Jippe, Afke and Menno.

Appendices

Appendix I. Entrepreneurial assessment framework based on HEInnovate (2013, updated November 2015)

Category 1: Leadership and Governance

Variable 1.1 Strategy: Entrepreneurship is a major part of the university strategy

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Mission statement	Extent to which a HEI has a working mission statement with an entrepreneurial vision for the future of the institution	Word 'entrepreneur' is mentioned on mission statement	Content analysis	D: HEI current strategic plan + HEI previous strategic plan
			Perception of respondent on whether the HEI has an entrepreneurial vision	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: HEI has an entrepreneurial vision
2	Strategy	Extent to which a strategy exists which clearly emphasises the importance of entrepreneurship, culturally, socially and economically	Importance of entrepreneurship is emphasised on strategy statement	Content analysis	D: HEI current strategic plan + HEI previous strategic plan
			Perception of respondent on whether the HEI has a strategy that emphasises the importance of entrepreneurship	Survey, Likert 1- 5 Faculty/Leadership	Q: HEI has a strategy that clearly emphasises the importance of entrepreneurship
3	Implementation plan	Extent to which and implementation plan exists with clear objectives and performance indicators	HEI has implementation plan	Content analysis of the existence of plan	D: HEI current strategic plan + HEI previous strategic plan HEI entrepreneurship policy (if existent)
		Extent to which specific objectives for entrepreneurship exist	HEI has specific performance objectives on entrepreneurship	Content analysis of the existence of objectives in the plan (see no 3a)	D: HEI current strategic plan + HEI previous strategic plan HEI entrepreneurship policy (if exist)
				Interview with top-management	Q: Does your HEI has made concrete objectives on entrepreneurship? If yes, which?
		Extent to which specific performance indicators for entrepreneurship exist	HEI has specific performance indicators on entrepreneurship	Content analysis of the existence of performance indicators in the plan (see no 3a)	D: HEI current strategic plan + HEI previous strategic plan HEI entrepreneurship policy (if existent)
				Interview with top-management	Q: Does your HEI has made concrete indicators on entrepreneurship? If yes, which?

Variable 1.2 High level commitment: There is commitment at a high level to implementing the entrepreneurial strategy

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Familiarity	Extent to which staff and students are familiar with the entrepreneurial agenda components of the HEI strategy	Perception of respondent on whether they know the vision, objectives and performance indicators of the entrepreneurial HEI strategy	Survey, Likert 1- 5 Faculty/Leadership Students	Q: I am well aware of the HEI's strategy on entrepreneurship
2	Priority	Extent to which they consider this as a priority	Perception of respondent on whether the entrepreneurial vision, objectives and performance indicators are a priority	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: The entrepreneurial elements of the strategy are a priority at HEI
3	Communication	Extent to which internal communication efforts are undertaken to support this	Number of 'entrepreneur' in the text of HEIs website Number of special (non-academic) articles published on 'entrepreneurship' in HEI magazine in the last 24 months	Content analysis	D: HEI website HEI Magazine HEI (e)Newsletter
			Availability of a strategic roadmap that is widely communicated throughout the HEI: for instance a brochure, logo, special website, newsletter	Content analysis	D: Internal communication plan
			Perception of respondent on whether internal communication efforts are undertaken to inform him/her about the entrepreneurial vision, objectives and performance indicators	Survey, Likert 1- 5 Faculty/Leadership Students	Q: My HEI is actively informing me about its entrepreneurial vision, objectives and performance indicators
			Extent to which the university community is informed about how the entrepreneurial strategy is reviewed and revised to keep it up to date	Content analysis	D: HEI website HEI Magazine HEI (e)Newsletter
4	Responsibilities	Extent and way to which someone at the level of the Dean or Rector is made responsible for the entrepreneurial agenda	Mentioning of responsibility for entrepreneurial agenda in a formal job description of a HEI official on the level of Dean or higher (Dean, Director, Vice Rector, Rector/Vice Chancellor)	Interview with top-management	Q: Who within HEI is responsible for the entrepreneurial agenda?

Variable 1.3 Coordination: The higher education institution has a model for coordinating and integrating entrepreneurial activities at all levels across the institution.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Coordination	Availability of an operational model for coordinating and integrating entrepreneurial activities across the HEI	Person in charge for special entrepreneurship unit at senior management level, if existent Coordination link of the special unit with others within the university, e.g. with departments/faculties/centers	Content analysis + Interview with top management	Q: Are entrepreneurship and innovation activities within the university coordinated? If yes, how?
2	Structure	Extent to which a structure is in place that is coordinating and supporting entrepreneurship and innovative activities within the university	Organizational structure for coordinating and supporting entrepreneurship and innovative activities within the university	Content analysis + Interview with top management	D: current organizational chart Q: how you coordinate entrepreneur-ship and innovative activities within the university?
			Perception of respondent on whether the organizational structure is coordinating entrepreneurship activities within the university	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: The entrepreneurship activities at HEI are well coordinated.
			Perception of respondent on whether the organizational structure is supporting entrepreneurship activities within the university	Survey, Likert 1- 5 Faculty/Leadership Students	Q: The structure of HEI is conducive for executing entrepreneurship activities.
			Perception of respondent on whether the organizational structure is coordinating entrepreneurship and innovative activities well with people outside the university	Survey, Likert 1- 5 Faculty/Leadership Students	Q: The structure of HEI is conducive for executing entrepreneurship activities with people outside the university.
		Extent to which the organizational structure is adapted to better deliver the entrepreneurial agenda	Change in the organizational structure made in the period of the last 3 years with the purpose to better deliver the entrepreneurial agenda	Content analysis	D: current organizational chart + organizational chart of 5 years ago
			YES/NO whether the organizational change is made because of the entrepreneurial agenda	Interview with top-management	Q: Please explain the reason for the organizational change(s), if any

Variable 1.4 Support to faculties: The Higher Education Institution encourages and supports faculties and units to act entrepreneurially

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Decentralization	Extent to which units within the university are encouraged to develop new activities and initiatives	Ability of unit to develop new activities and initiatives is stated in the mandate	Interview top-management & staff & students	Q: In what way faculties and units are encouraged to develop new activities and initiatives
			Perception of respondent on whether units are allowed to develop new activities and initiatives	Survey, Likert 1- 5 Faculty/Leadership Students	Q: There is large freedom at HEI to pursue own activities and initiatives
2	Ownership and responsibility	Extent to which unit has full ownership and responsibility that comes from their own entrepreneurial endeavour	Ownership and responsibility of unit entrepreneurial endeavour is stated in the mandate	Content analysis	Mandate of units
3	Incentives and Rewards	Extent to which faculties and units are stimulated to demonstrate entrepreneurial and innovative outcomes	Availability of incentives and rewards for faculties and units to demonstrate entrepreneurial and innovative outcomes	Interview top-management & staff	Q: In what way faculties and units are stimulated to demonstrate entrepreneurial and innovative outcomes? Please give concrete examples? What is the result? What are the challenges?
			Perception of respondents on whether faculties and units are stimulated to demonstrate entrepreneurial and innovative outcomes	Survey, Likert 1- 5 Faculty/Leadership Students	Q: People at HEI are stimulated to develop entrepreneurial or innovative ideas

Variable 1.5 Relation to wider regional, social and community environment: The higher education institution is a driving force for entrepreneurship development in the wider regional, social and community environment

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Supporting community development	Extent to which the university is supporting and driving community development[20]	Numbers of projects for community development (if more locations, each location counts as 1)	Content analysis	D: Reports at the Directorate of Community Development/Outreach
				Interview with the Director of Community Development/ Outreach	Q: What kind of projects do you do for the community? Can you give examples of the impact of these projects?
			Estimate of distance between the HEI main campus and the location of the community, categorization: Municipality; Province; Beyond Province	Content analysis	D: Reports at the Directorate of Community Development/Outreach
			Number of projects per category: Municipality; Province; Beyond Province	Content analysis	D: Reports at the Directorate of Community Development/Outreach
			Number of projects per category that support entrepreneurship development, categorization: Municipality; Province; Beyond Province	Content analysis	D: Reports at the Directorate of Community Development/Outreach
			Perception of respondent on whether the institution has positive impact on community development	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: HEI actively supports community development
2	Facility sharing	Extent to which HEI facilities are offered to others outside the institution	Numbers of academic facilities used by others outside the institutions	Interview to top management	Q: Is it possible for others outside HEI to make use of academic facilities, not including the mosque, gym, cafeteria, and student hotel?
3	Supporting the industries	Extent to which opportunities are offered for regional start-ups and established companies	Number of projects with industries	Content analysis	D: Business Development Directorate
			Estimate of distance between the HEI main campus and the location of the company, categorization: Municipality; Province; Beyond Province	Content analysis	D: Business Development Directorate

[20]Community is defined as 'grassroot level'.

				Interview with the Director Business Development	Q: What kind of projects do you have with industries, from small scale to large companies? Can you give examples of the impact of these projects?
			Number of companies by location: Municipality; Province; Beyond Province	Content analysis	D: Business Development Directorate
			Number of companies by size. Categories: Micro/small: Medium: Large: >	Content analysis	D: Business Development Directorate
			Number of companies by period of duration in operation. Categories: Less than 1 year 1 – 5 years More than 5 years	Content analysis	D: Business Development Directorate
			Number of companies defined by start-ups and established companies, per category: Municipality; Province; Beyond Province & Year of foundation	Content analysis	D: Business Development Directorate
			Perception of respondent on whether HEI supports industries	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: HEI supports companies in all kind of ways, whether the companies are small or big, new or already well established
4	Participating in regional development	Extent to which the institution takes part in regional development clusters or platforms	Number of activities for regional development (activity on the level of Province)	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research (LPPM)
			Estimate of distance between the HEI main campus and the location of the project, categorization: Municipality; Province; Beyond Province	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research
			Number of projects per category: Municipality; Province; Beyond Province	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research
			Number of regional development projects in which HEI is the chair	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research
			Number of regional development platforms of which HEI is a member	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research

				Interview with the Director Community Development/ Outreach & Research	Q: What kind of platforms for regional development (province level) exist in which HEI participates? What is the role of HEI in these platforms? Can you give examples of the impact of these platforms?
			Perception of respondent on whether the institution has positive impact on regional development	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: HEI's support has positive impact on regional (Province) development.
5	Participating in local development	Extent to which the institution is playing an active role in determining the strategic direction of local development	Numbers of projects for local development (activity on the level of Municipality)	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research
			Estimate of distance between the HEI main campus and the location of the project, categorization: Municipality; Province; Beyond Province	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research
			Number of projects per category: Municipality; Province; Beyond Province	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research
			Number of local development projects in which HEI is the chair	Content analysis	D: Reports at the Directorate of Community Development/Outreach & Research
				Interview with the Director Community Development/ Outreach & Research	Q: What kind of platforms for local development (Municipality level) exist in which HEI participates? What is the role of HEI in these platforms? Can you give examples of the impact of these platforms?
			Perception of respondent on whether the institution has positive impact on local development	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: HEI's support has positive impact on local (Municipality) development.
6	Supporting local culture	Extent to which local cultural, social, and artistic activities are supported	Number of local artists performance at HEI Number of cultural activities supported, such as a fair, exhibition, performance	Interview with the head Public relations	Q: How many and what kind of local cultural activities are supported by HEI?
			Perception of respondent on whether HEI supports local (social and/or artistic) culture	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: HEI actively supports local cultural activities.

18 indicators

Category 2: Organizational Capacity, People and Incentives

Variable 2.1 Funding: The higher education institution's entrepreneurial objectives are supported by a wide variety of funding sources/investment, including investment by external stakeholders.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Diversified funding source	Extent to which a diversity of funding sources are available	Variety of HEI funding sources: % of government funding % of tuition fees % of scholarships % of private parties % of income generating activities / university enterprises % of contracts/projects % of other	Content analysis	D: HEI audit report of the last 5 years
			% of externally funded contract research as proportion of total research budget (year-1)	Content analysis	D: HEI audit report of the last 5 years
			Variety of HEI funding source: % of government funding % of tuition fees % of scholarships % of private parties % of income generating activities / university enterprises % of contracts/projects % of other	Interview to top-management	Q: What are the sources of institutional funding? What is your strategy towards diversity of funding? What has been the results so far? Please explain in historical perspective (last 5 – 10 years) if deemed relevant.
			Perception of respondent on to which extent the HEI has diversity of funding sources	Survey, Likert 1- 5 Faculty/Leadership	Q: I find that HEI is sufficiently able to attract various sources of funding to run the university.
2	Financial investments	Extent to which the university's financial strategy entails investing in its entrepreneurial activities	Percentage of annual HEI funds used for commercialization and entrepreneurship development activities: budget for business incubation over the last 5 years	Content analysis	D: Directorate of Business Development
				Interview with the Director of Business Development	Q: What is your strategy towards funding business incubation? What has been the results so far? Please explain in historical perspective (last 5 – 10 years) if deemed relevant.
			Perception of respondent on whether HEI provides financial support for entrepreneurial activities	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: I find that HEI is investing a lot of money in entrepreneurship development activities. If I have an entrepreneurial idea, HEI is willing to invest in it.

Variable 2.2 Internal cooperation: There are mechanisms in place for breaking down traditional boundaries and fostering new relationships - bringing internal stakeholders together (staff and students) and building synergies between them.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Sharing	Extent to which sharing of knowledge, facilities, and resources is internally stimulated		Interview with 1 or more Deans	Q: Which policy is available for internal (on HEI level) sharing of knowledge, facilities, and resources? Which challenges and opportunities do you encounter when implementing this policy?
			Perception of respondent on whether knowledge sharing is stimulated within HEI	Survey, Likert 1- 5 Faculty/Leadership Students	Q: I am stimulated at HEI to study or work together with people from other departments or units. I find that knowledge sharing is stimulated within HEI.
			Perception of respondent on whether facilities sharing is stimulated within HEI	Survey, Likert 1- 5 Faculty/Leadership Students	Q: I find that that it is stimulated at HEI to share facilities as much as possible.
2	Student-staff cooperation	Extent to which mechanisms and/or structures are in place for student-staff cooperation for entrepreneurial activities	Availability of procedures and/or structures for student-staff business cooperation	Content analysis	D: University regulations
			Numbers of business activities resulted from student-staff cooperation	Content analysis	D: List at the Directorate of Business Development
			Perception of respondent to what extent HEI support student-staff business cooperation	Survey, Likert 1- 5 Faculty/Leadership Students	Q: I find that HE stimulates students and staff to work together for business development
3	Interdisciplinary	Extent to which interdisciplinary structures are in place	Availability of structure for interdisciplinary cooperation	Content analysis	D: organization chart (number of interdisciplinary units)
			Numbers of interdisciplinary degrees	Content analysis	D: HEI catalogue of education programs
			Perception of respondent whether the structure support interdisciplinary cooperation	Survey, Likert 1- 5 Faculty/Leadership Students	*See 2.2.1 Q:* *I am stimulated at HEI to work together with people from other departments or units.*
4	Cross faculty cooperation	Extent to which cross-faculty teaching and research groups exist and function satisfactory	Availability and functioning of policy on cross-faculty teaching and research groups	Interview of 1 or more Deans	Q: What is the HEI policy towards cross-faculty teaching and research groups? Which challenges and opportunities do you encounter when implementing this policy?
			Numbers of cross-faculty research groups	Content analysis	D: List at Directorate of Research
			Perception of respondent whether cross-faculty research group is satisfactory functioning	Survey, Likert 1- 5 Faculty/Leadership	Q: I am stimulated at HEI to undertake research in a cross-faculty team. I find that at HEI cross-faculty research is functioning satisfactorily.

Variable 2.3 Recruitment: The higher education institution is open to recruiting and engaging with individuals who have entrepreneurial attitudes, behaviours and experience.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Diversity	Extent to which importance is given to recruiting people with diverse backgrounds	Availability of staff from diverse backgrounds (race, religion, ethnic group)	Content analysis	HR policy
				Survey, Likert 1-5 Faculty/Leadership Students External	HEI finds it important to recruit people from diverse background (ethnicity, race, religion)
2	Entrepreneurial attitude and background of staff	Extent to which entrepreneurial attitudes and experience play a role as criteria for recruitment (faculty and support staff)	Staff recruitment criteria includes entrepreneurial attitude	Content analysis	D: Internal Affairs / Office of Human Affairs
			Staff recruitment criteria includes entrepreneurial experience	Content analysis	D: Internal Affairs / Office of Human Affairs
			Number of dual appointments (industry / academic) – teachers having both positions in university and in business	Content analysis	HR records
				Interview with top-management	Q: Do you have recruitment criteria on entrepreneurial attitudes, and/or experience? What is your HR policy in relation to recruit employees with entrepreneurial attitudes, and/or experience? What has been the result of this policy so far?
				FDG to lecturers in entrepreneurship, managers of university enterprises, or university – industry linkage	Q: Are entrepreneurial attitude and experience integrated in staff development plans, training, recruitment, performance evaluations and reward systems for positions with an explicit entrepreneurial character, like lecturers in entrepreneurship, managers of university enterprises, or university – industry linkage officers?
			Perception of respondent on whether the employees have entrepreneurial attributes, operationalized by initiative taking, willing to take risks, achievement oriented, and capacity to make things happen	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: Many HEI employees are taking initiative. Many HEI employees have the capacity to make things happen.
			Perception of respondent on whether HEI recruits people with entrepreneurial background outside the academia	Survey, Likert 1- 5 Faculty/Leadership Students External	Q: HEI recruits people with entrepreneurial background outside the academia (from private sector or NGO

3	Status and recognition	Extent to which people that contribute to HEI entrepreneurial agenda are recognized	Availability of recognition and/or status for staff that actively supports entrepreneurship and/or business creation activities	Content analysis Interview	D: HR policy / business development policy Q to top-management
			Perception of respondent whether staff get recognition and/or status (i.e. different route to tenure/professorship) if contributing to HEI entrepreneurial agenda	Survey, Likert 1-5 Faculty/Leadership	Q: At HEI, people that contribute to HEI entrepreneurial agenda have a higher status than others
4	Shared risk and rewards	Extent to which the institution is willing to share a business risk (and reward) if an external stakeholder is cooperating with the university	Availability of policy for business risk and/or reward sharing with external stakeholders	Content analysis	D: Business development policy
				Interview/FGD with • top-management • externals	Q: Does HEI have procedures for business risk and/or reward sharing with external stakeholders? Under which conditions? Do you have examples? What are the challenges that arise? What is the benefit?

Variable 2.4 Staff development: The higher education institution invests in staff development to support its entrepreneurial agenda.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Career development	Extent to which the institution career development policy is addressing the entrepreneurial agenda	Entrepreneurial agenda is addressed in career development policy	Content analysis	D: HR Policy
				Interview with top-management	Q: Do you also base the HEI career development of staff on entrepreneurial attitudes, and/or experience? What is your HR policy in relation to career development? Do you have a budget for training on entrepreneurship related topics? What has been the result of this policy so far?
			Perception of respondent on whether HEI career development policy is among others based on being entrepreneurial, measured by appreciation of the following attributes: • Intuitive decision making • Capacity to make things happen autonomously • Networking • Initiative taking • Opportunity identification • Creative problem solving • Innovative, future, and achievement oriented • Willing to take reasonable risks • Perseverance.	Survey, Likert 1- 5 Faculty/Leadership	Q: I find that it is good for my career at HEI if I take decisions intuitively. I find that it is good for my career at HEI if I can identify opportunities. I find that it is good for my career at HEI if I am innovative. I find that it is good for my career at HEI if I am willing to take reasonable risks. I find that it is good for my career at HEI if act with perseverance.
2	Employee goals	Extent to which this policy is tailoring to the key goals of the employees	Availability of an operational procedure to ensure alignment of the career development policy with employees' needs	Content analysis Interview	D: HR Policy Q to top-management: How do you ensure that the career development policy is aligned with employees' needs?
			Perception of respondent on whether the career development policy is aligned with employees' needs	Survey, Likert 1- 5 Faculty/Leadership	Q: My needs are taken into account in the career development policy of HEI.
3	Employee performance measurement	Extent to which individual objectives and performance indicators are set for all staff supporting the implementation of the entrepreneurial agenda	Availability of employee performance indicators that based on entrepreneurial agenda	Content analysis	D: HR policy

			Perception of respondent whether employee performance indicator is based on entrepreneurial agenda	Survey, Likert 1- 5 Faculty/Leadership	Q: I find that employee performance indicators are based on HEI entrepreneurial vision and strategy
		Extent to which staff progression is measured	Availability of periodic measurement of staff performance	Content analysis	D: HR policy
4	Training	Extent to which training needs are linked with the career objectives that support the entrepreneurial agenda	Perception of respondent whether training is given in line with HEI entrepreneurial agenda	Survey, Likert 1- 5 Faculty/Leadership	Q: The HEI provides appropriate training for me to be more entrepreneurial

Variable 2.5 Incentives and rewards: There are clear incentives and rewards for staff who actively support the higher education institution's entrepreneurial agenda.

	Indicator	**Full description**	**Measurement**	**Data collection method**	**Question (Q) or document (D)**
1	Incentives and Rewards	Extent to which an incentive and reward system is in place for staff that actively supports entrepreneurship and business creation activities, other than teaching, research and publication	Availability of incentives and/or reward system for staff that actively supports entrepreneurship and/or business creation activities	Content analysis Interview	D: HR policy / business development policy Q to top-management
			Perception of respondent on whether staff get incentives and/or reward when: *demonstrate enterprise, innovation and creativity in research, teaching and pursuit and use of knowledge across boundaries (Gibb, 2013)*	Survey, Likert 1- 5 Faculty/Leadership	Q: Staff that takes part in business activities are sufficiently rewarded by HEI. Staff that gets external research funding are sufficiently rewarded by HEI. Staff that develops an innovative study program are sufficiently rewarded by HEI. Staff that are creative in addressing community problems are sufficiently rewarded by HEI.
		Extent to which an institutional fund is available to stimulate innovation and change by staff		Content analysis Interview	D: HR policy / business development policy Q to top-management
2	Culture and procedures	Extent to which the culture and procedures of HEI stimulates entrepreneurial behaviour of staff	Perception of respondent on whether they are encouraged to develop new activities and initiatives	Survey, Likert 1- 5 Faculty/Leadership Students	Q: I can easily develop new entrepreneurial activities or initiatives
		Extent to which autonomy and individual ownership of initiatives is stimulated	Individual autonomy for initiatives is stated in HEI regulations of 2 different units	Content analysis	D: Basic function and mandate of 2 different units

			Individual ownership of initiatives is recognized in HEI regulations of 2 different units	Content analysis	
			Perception of respondent on whether ownership of initiatives is recognized within the HEI	Survey, Likert 1- 6 Faculty/Leadership Students	Q: HEI recognizes my ideas as mine I am rewarded sufficiently when I come up with new ideas.
			Institutional versus individual ownership of patents	Content analysis	D: IP policy and regulations
			Perception of respondent on whether individual ownership of IP is recognized within the HEI	Survey, Likert 1- 6 Faculty/Leadership Students	Q: HEI recognizes my intellectual property is as my own.
3	Work load reduction	Extent to which teaching loads are reduced in favour of pursuing entrepreneurial activities	Availability of policy that allow teaching load reduction for staff to pursue entrepreneurial activities	Content analysis	D: HR Policy
		Extent to which teaching loads are reduced in favour of pursuing entrepreneurial activities	Availability of policy that allow teaching load reduction for staff to pursue entrepreneurial activities	Content analysis	D: HR Policy
		Extent to which sabbaticals are possible	Availability of sabbatical leave for staff to pursue entrepreneurial endeavour	Content analysis	D: HR Policy
		Extent to which (part-time) wor-king in own companies is allowed / stimulated	Availability of part time leave for staff to work in own companies	Content analysis	D: HR Policy
4	Facility usage	Extent to which office and laboratory spaces can be used freely by staff for pursuing entrepreneurial activities	Availability of policy that allow office and laboratory spaces usage for staff for entrepreneurial activities	Content analysis	D: HR Policy
1, 2, 3, 4				FGD to staff	Q: In what way is HEI supporting staff entrepreneurial activities, especially creating their own business. For instance with time support (sabbatical, part-time, teaching load reduction), use of facilities, fund and rewards/incentives.

18 indicators

Category 3: Entrepreneurial Teaching and Learning

Variable 3.1 Formal learning: The Higher Education Institution provides diverse formal learning opportunities to develop entrepreneurial mind-sets and skills.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Entrepreneurship degree programs	Extent to which entrepreneurship degree programs are offered (BSc, MSc, PhD, minor, major, courses)	Numbers and type of entrepreneurship degree program available	Content analysis	D: Overview of all degree programs of the HEI
			Share of students enrolled for entrepreneurship courses as percentage of total amount of students, previous academic year	Content analysis	
			Number of students enrolled for entrepreneurship course(s), previous academic year	Content analysis	
			Perception on whether entrepreneurship degree programs strengthen entrepreneurial mind-sets, behaviour and skills	FGD with students that followed / have followed entrepreneurship degree programs (other than introduction course)	Q: What entrepreneurship degree programs did you follow/are following? Do these programs strengthen entrepreneurial 1) mind-sets, 2) behaviour and 3) skills? How? What would you think should be improved?
2	Diversity of entrepreneurial teaching methods	Extent to which a diversity of entrepreneurial methods are used in teaching	Teaching methods as described in curriculum, whether entrepreneurship or non-entrepreneurship courses Entrepreneurial teaching methods are: the use of mentors, living labs, cross disciplinary learning, simulations, and competitions	Content analysis	D: Curriculum & course descriptions of entrepreneurship courses
3	Entrepreneurial teaching skills development for staff	Extent to which university staff has access to support and training on entrepreneurial teaching & learning	Estimated number of staff participate on training on entrepreneurial teaching methods in the last 5 years: the use of mentors living labs cross disciplinary learning simulations competitions	FGD with Faculty Leadership	Q: Is training on entrepreneurial teaching methods offered to faculty in the last 5 years? What are the topics? How many people did participate? What is the benefit of this training? Are there any changes in the teaching as a consequence of the training? Do you have additional training needs in this area? Is yes, which?
			Availability of budget for training on entrepreneurship related topics	Content analysis	D: HR Policy

			Perception of respondent to what extent HEI offers training on entrepreneurial teaching	Survey, Likert 1- 5 Faculty/Leadership	Q: At HEI, staff has sufficient possibility to get training on entrepreneurial teaching
4	Student feedback	Extent to which student feedback mechanisms are in place	Existence of student feedback procedures about development of entrepreneurial mind-sets and skills	Content analysis	D: Student Affairs
			Estimated frequency of meetings with student representatives related to the development of entrepreneurial mind-sets and skills. Categorization: 1. per month; 1 per semester; 1 per year; less than once a year	Interview or FDG with students	Q: If you have comments or ideas on how at HEI entrepreneurial mind-sets and skills could be developed, how will you let the staff know? Do you have regular meetings in which you can share your feedback? If yes, how many times per year?
			Perception of respondent to what extent student feedback about development of entrepreneurial mind-sets and skills is in place	Survey, Likert 1-5 Faculty/Leadership Students	Q: I find that students are given enough opportunities to give feedback. I find that student feedback results in changes at HEI
5	Entrepreneurial encouragement for students	Extent to which students are encouraged to develop entrepreneurial mind-sets, behaviour and skills	Availability of entrepreneurship awareness program for all students	Content analysis	D: Overview of all degree programs and non-degree training of the HEI
			Perception of respondent to which extent HEI encourages students to develop entrepreneurial mind-sets, behaviour and skills	Survey, Likert, 1-5 Students	Q: I find that HEI encourages me enough to develop entrepreneurial mind-sets, behaviour and skills
				FGD with Leadership Faculty Students	Q: What is the university doing to encourage students to be more entrepreneurial?

Variable 3.2 Informal learning: The Higher Education Institution provides diverse informal learning opportunities and experiences to stimulate the development of entrepreneurial mindsets and skills.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Entrepreneurship non degree training	Extent to which non-degree entrepreneurship training are offered	Numbers and type of entrepreneurship non-degree training available, whether organized by HEI or student organizations	Content analysis	D: Overview of all non-degree training of the HEI
			Number of participants to non-degree entrepreneurship training, previous academic year	Content analysis	D: Overview of all non-degree training of the HEI
				FGD with students externals that participate(d) entrepreneurship non-degree training	Q: What entrepreneurship non-degree training did you follow/are following? Does these training strengthen entrepreneurial 1) mind-sets, 2) behaviour and 3) skills? How? What would you think should be improved?
2	Student organizations and society	Extent to which student organizations exist that stimulate entrepreneurship	Numbers of student organizations that undertake entrepreneurship related activities	Content analysis	D: Student Affairs
			Perception of respondent to what extent student organizations exist that stimulate entrepreneurial activities	Survey, Likert 1-5 Faculty/Leadership Students	Q: I find that student organizations undertake entrepreneurship activities sufficiently
				Interview/FDG with: Students	Q: What student organization do you join? What kind of entrepreneurial activities are taken place in these organizations? And wat for? What are the challenges that arise? What is the benefit?
		Extent to which there is an active student entrepreneurship society	Existence of student entrepreneurship society & number of its members (if applicable)	Content analysis	D: Student Affairs
			Perception of respondent to what extent there is an active student entrepreneurship society	Survey, Likert 1-5 Faculty/Leadership Students	Q: I find that HEI has an active student entrepreneurship society
				Interview/FDG with: Students	Q: Is there a student entrepreneurship society, or more than one? What kind of entrepreneurial activities are taken place? And what for? What are the challenges that arise? What is the benefit?

		Extent to which these student entrepreneurship development structures are (financially) supported by the university	Estimated number of HEI (co-)funded student entrepreneurship activities or organizations per year	Interview/FDG with: Students	Q: What is the financial support you receive from HEI for entrepreneurship activities or organizations per year? How much and what for? What are the procedures? What are the challenges that arise?
3	Networking events	Extent to which networking mechanisms are in place	Estimated number of formal network events with private and public actors organized by HEI during the last 5 years in which students were free to participate	Content analysis	D: HEI calendar of events
			Perception of respondent whether HEI organizes sufficient networking opportunities for students	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that HEI undertakes beneficial relations with important players in business
			Perception of respondent whether HEI network is useful for students	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that HEI has a very useful network for students
4	Student business competition	Extent to which student business competitions and awards exist within HEI	Total number of students that participated in the last 5 years in a business competition and/or award where HEI (or a unit of HEI)is actively involved	Content analysis	D: Organization record on number of students participated in the last 5 years in a business competition organized/ promoted by HEI (or a unit of HEI) -> Student Affairs
			Perception of respondent whether there is enough student business competitions	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that HEI organizes enough student business competitions
				Survey, Likert, 1-5 Students	Q: Business competitions organized by HEI are interesting enough to join.
5	Formal recognition of extra-curricular entrepreneurial activities	Extent to which student can get formal recognition for his/her entrepreneurial extracurricular activities	Availability of recognition (extra credit or certificate) for entrepreneurial extracurricular activities	Content analysis	D: Extracurricular activities recognition document student affairs →
6	Entrepreneurial encouragement for students	Extent to which students are encouraged to develop entrepreneurial mind-sets, behaviour and skills	Availability of entrepreneurship development program for all students	Content analysis	D: Overview of degree and non-degree programs of the HEI
			Perception of respondent whether all students are encouraged to develop entre-preneurial mind-sets, behaviour and skills	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that HEI emphasizes the development of entrepreneurial mind-sets and skills of all of its students

7	Entrepreneurial encouragement for staff	Extent to which staff is encouraged to develop entrepreneurial mind-sets, behaviour and skills	Availability of entrepreneurship development training program for employees	Content analysis	D: HR Office: Overview of training programs offered to employees
			Perception of respondent whether staff are encouraged to develop entrepreneurial mind-sets, behaviour and skills	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that HEI emphasizes the development of entrepreneurial mind-sets and skills of all of its employees

Variable 3.3 Validation of entrepreneurship learning outcomes: The higher education institution validates entrepreneurship learning outcomes.

	Indicator	**Full description**	**Measurement**	**Data collection method**	**Question (Q) or document (D)**
1	Entrepreneurship as learning outcome	Extent to which entrepreneurship is an explicit part of a system that is measuring expected learning outcomes of degree programs and courses	Entrepreneurship (knowledge, skills and competence) is included in expected learning outcomes in all degree courses, sample of at least 2 degree programs per faculty	Content analysis	D: Academic Affairs: Course descriptions
			Perception of respondent to which extent entrepreneurship (knowledge, skills and competence) is explicitly included in the learning outcomes of all degree programs	FDG with Faculty	Q: Do you think that entrepreneurship (knowledge, skills and competence) should be explicitly included in the learning outcomes of all degree programs? Why?
2	Clear understanding of entrepreneurship learning outcome	Extent to which students understand the entrepreneurial learning outcomes	Perception of respondent on whether they understand the entrepreneurial learning outcomes	FDG with students	Q: Do you know the entrepreneurial learning outcomes of your program? What is your opinion about this?
				Survey, Likert, 1-5 Students	Q: I find that I perfectly understand the entrepreneurial learning outcomes of my program
3	Validation of entrepreneurship learning outcome	Extent to which a system is in place to validate and review entrepreneurship as learning outcome(s)	Availability of procedures to measure and learning outcomes	FDG with faculty	Q: Do you have procedures to measure the learning outcomes of your programs? Do you review your procedures, and if so, how regularly?
			Perception of respondent on whether entrepreneurial learning outcomes are well measured	Survey, Likert, 1-5 Faculty	Q I find that entrepreneurial learning outcomes are well measured in the degree program(s) where I teach

Variable 3.4 Collaborating and engaging with external stakeholders: The Higher Education Instition co-designs and delivers the curriculum with external stakeholders.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Managing external stakeholders	Extent to which cooperation with external stakeholders is organized and maintained on regular basis	Existence of a coordinating unit for external relations	Content analysis	D: Organizational structure with mandates
			Perception of respondent of to which extent HEI organizes cooperation with external stakeholders	Survey, Likert, 1-5 Leadership Faculty Students External	Q: I find that external relations are well managed at HEI
		Extent to which information on these external stakeholders, like contact details, history of cooperation, account manager, etc. is available in a structured and accessible manner	Existence of a database with external stakeholders	Interview with top-management	Q: Do you register and update information on HEIs external relations? If so, how? Do you make an overview of your most important partners?
2	Course development	Extent to which staff work with external stakeholder to deliver high quality course	Experience and expertise of external stakeholders is integrated into courses	Survey, Likert, 1-5 Survey to students	I find that case studies and assignments are based on experiences of business people, government officials or community leaders.
					I find that business people, government officials or community leaders are regularly engaged in education, for instance as guest lecturers.
3	Integrated education	Extent to which experience and expertise of external stakeholders is integrated into entrepreneurship extracurricular learning activities	Use of external stakeholders experience in entrepreneurship	FGD with faculty of entrepreneurship education	Q: Do you use experience and expertise of external stakeholders in into entrepreneurship education? If yes, how? And in what form? What are the challenges? What are the benefits?
			Use of external stakeholders experience in business start-up support service	FGD with staff involved in business start-up support service / entrepreneurship education (to be specified)	Q: Do you use experience and expertise of external stakeholders in business start-up support services? If yes, how? And in what form? What are the challenges? What are the benefits?
4	Diversity of collaboration	Extent of where different partners are actively engaged with the university	Existence of partnership with each stakeholders local communities and organisations, local and regional governments, chambers of commerce, industry and HEI alumni	Content analysis	D: Organizational structure HEI strategy

				Interview with top-management	Q: Do you register and update information on HEIs alumni? Local and regional government? Chamber of commerce? Community leader? If so, how? How do you maintain relations with your alumni, whether local, national or international
				Survey, Likert, 1-5 Leadership/Faculty Students Externals	Q: HEI is good in maintaining relations with its alumni, locally, nationally and internationally HEI is good at maintaining relations with government HEI is good at maintaining relations with chamber of commerce HEI is good at maintaining relations with community leader

Variable 3.5 Research: Research results are integrated into entrepreneurship education and training.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Research integrated curriculum	Extent to which knowledge gained in entrepreneurship research is integrated into the curriculum	Number of entrepreneurship related research carried out by HEI faculty: number of publications during the last 2 years with 'entrepreneur' included in the title	Content analysis	D: Scanning of HEI list of publications during the last 2 years with 'entrepreneur' included in the title
			Availability of entrepreneurship research findings that are included into the curriculum	FDG with faculty	Q: Do you use entrepreneurship research findings in entrepreneurship education and training? If yes, how? And in what form? What are the challenges? What are the benefits?
			Perception of respondent whether entrepreneurship research findings are integrated into the curriculum	Survey, Likert, 1-5 Faculty	Q: I find that case studies and assignments are based on research findings.
2	Research findings exchange	Extent to which internal exchange of research findings is encouraged	Numbers of interdepartmental/interfaculty seminars per year during the last 5 years	Content analysis	D Office for Research and Community Outreach (At HEI: LPPM)
			Perception of respondent whether exchange of research findings is encouraged	Survey, Likert, 1-5 Leadership Faculty	Q: I find that internal exchange of research findings is encouraged.
3	Networking with other HEI	Extent to which networking with other HEI is encouraged for sharing and learning	Number formal partnerships with other HEIs	Content analysis	D: Information from Directorate of External relations
			Perception of respondent whether HEI has good networking with other HEI	Survey, Likert, 1-5 Leadership Faculty Students	Q: HEI has good learning networks with other universities

22 indicators

Category 4: Preparing and Supporting Entrepreneurs

Variable 4.1 The Higher Education Institution increases awareness of the value of entrepreneurship and stimulates the entrepreneurial intentions of students, graduates and staff to start-up a business or venture.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Student entrepreneurship awareness	Extent to which entrepreneurship awareness among all students is stimulated	Availability of entrepreneurship awareness program for all students	Content analysis	D: Overview of degree and non-degree programs of the HEI
			Perception of respondent whether it is important that entrepreneurship awareness program is offered to all students	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: HEI emphasizes entrepreneurship awareness for all of its students
2	Staff entrepreneurship awareness	Extent to which entrepreneurship awareness among all faculty and staff is stimulated	Availability of entrepreneurship awareness program for all new staff	Content analysis	D: Training program for new employees
			Perception of respondent whether it is important that entrepreneurship awareness program is offered to all employees	Survey, Likert, 1-5 Leadership Faculty Students	Q: HEI emphasizes entrepreneurship awareness for all of its employees
3	Conducive framework	Extent to which HEI provides a conducive framework for start-up, such as enabling staff to own shares, work part-time, take sabbaticals, and the possibility for students to Extent the duration of their study programs to support starting a new venture whilst studying	Availability of policy that enables staff and students to take time off their work/study to start up a business	Content analysis	D: HR policy Student policy
			Perception of respondent whether staff is enabled to combine starting-up a business with work or study	Survey, Likert, 1-5 Leadership Faculty	Q: I find that at HEI it is possible to combine my study or work with starting-up a business
			Perception of respondent whether students are enabled to combine starting-up a business with work or study	Survey, Likert, 1-5 Leadership Faculty	Q: I find that at HEI it is possible to combine my study or work with starting-up a business
4	Work load reduction	Extent to which teaching loads are reduced in favour of pursuing entrepreneurial activities	Availability of policy that allow teaching load reduction for staff to pursue entrepreneurial activities	Content analysis	D: HR Policy

		Extent to which research loads are reduced in favour of pursuing entrepreneurial activities	Availability of policy that allow research load reduction for staff to pursue entrepreneurial activities	Content analysis	D: HR Policy
		Extent to which sabbaticals are possible	Availability of sabbatical leave for staff to pursue entrepreneurial endeavour	Content analysis	D: HR Policy
		Extent to which (part-time) working in own companies is allowed / stimulated	Availability of part time leave for staff to work in own companies	Content analysis	D: HR Policy
5	Communication	Extent to which HEI makes effective use of communication channels to raise awareness of opportunities and showcase entrepreneurship among staff and students across all parts of the institution	Availability of internal communication that showcase student and staff entrepreneurship	Content analysis	D: Internal media
			Perception of respondent whether HEI showcases staff/student entrepreneurship to raise entrepreneurship awareness stimulates him/her to start-up a business	Survey, Likert, 1-5 Leadership Faculty Students	Q: The attention for entrepreneurship in HEI media makes me want to start a business too
			Perception of respondent on whether internal communication efforts are undertaken to raise awareness of opportunities and showcase entrepreneurship among staff and students across all parts of the institution	Survey, Likert, 1-5 Leadership Faculty Students	Q: My HEI is actively informing me about entrepreneurship opportunities
			Number of 'entrepreneur' in the text of HEIs website Number of special (non-academic) articles published on 'entrepreneurship' in HEI magazine in the last 24 months	Content analysis	D: Website, indicating date of review HEI Magazine:
		Extent to which special entrepreneurship events are organized	Number of entrepreneurship-related events organized per semester, such as a fair, expo, seminar, conference over the last 5 years	Content analysis	D: Online HEI calendar Office of Academic Affairs

			Number of total seat capacity of entrepreneurship seminars organized on university level in a period of 12 months divided by the total number of undergraduate students	Content analysis	D: Calendar of HEI events over the last 12 months
				Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that HEI organizes many entrepreneurship events, such as a fair, expo, seminar, or conferences
6	Entrepreneurship recognition	Extent to which HEI celebrates and recognises successes of students, graduates and staff entrepreneurs	Availability of formal recognition (ceremony/award) of student/ staff/alumni entrepreneur	Content analysis	D: Entrepreneurship award/ceremony
7	Entrepreneurial opportunities for students	Extent to which HEI provides opportunities for students to be involved in research projects leading to entrepreneurial opportunities and to take up internships with entrepreneurs	Availability of opportunities for students to be involved in research projects leading to entrepreneurial opportunities and to take up internships with entrepreneurs	Interview with top management	Q: Is HEI offering opportunities for students to be involved in research projects leading to entrepreneurial opportunities and to take up internships with entrepreneurs? Why/ What are the results? What are the challenges?
			Perception of respondent whether HEI provides opportunities to students to participate in entrepreneurial research projects	Survey, Likert, 1-5 Students	Q: I find that HEI provides me many opportunities to participate in entrepreneurial research projects
		Extent to which HEI provides opportunities for students to take up internships with entrepreneurs	Perception of respondent whether HEI offers opportunities to take up an internship in business	Survey, Likert, 1-5 Students	Q: I find that HEI offers me plenty of opportunities to take up an internship in business

Variable 4.2 Business creation support: Higher Education Institution supports its students, graduates and staff to move from idea generation to business creation.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Business creation program	Extent to which a program is offered that supports students, graduates and staff to move from idea generation to business creation (start-up, sustaining and growth, exit)	Availability of entrepreneurship program that supports students, graduates and staff to move from idea generation to business creation (start-up, sustaining and growth, exit)	Interview to Director Business Development	Q: Is there any support for student or staff to start-up a business? Which program is offered? What kind of support What are the challenges?
			Availability of Entrepreneurship Program that supports students, graduates and staff to move from idea generation to business creation (start-up, sustaining and growth, exit)	FGD with Top-management Faculty	Q: Does HEI offer a complete entrepreneurship program that supports students, graduates and staff to move from idea generation to business creation? What is the content of this program? What are the results? What are the challenges?
			Perception of respondent whether the entrepreneurship program supports students, graduates and staff to move from idea generation to business creation	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find HEI is offering an entrepreneurship program that supports students, graduates or staff to move from idea generation to business creation
			Perception of respondent whether HEI has business support system	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that HEI strongly supports the start-up of businesses
			Number of start-ups founded by students, graduates or staff members, period: last 3 years	Content analysis	D: Directorate of Business Development
			Number of university Spin-offs with share of the university, period: last 3 years	Content analysis	D: Directorate of Business Development
2	IP support	Extent to which HEI provides intellectual property assistance for potential start-ups	IP Policy and instruments	Content analysis	D: IP Policy, Research Directorate
			Number of patents registered in the last 5 years	Content analysis	D: Research Directorate
			Number of patent applications in the last 5 years	Content analysis	D: Research Directorate
				Survey, Likert 1-5 Faculty/ Leadership Student Alumni/Externals	Q: I find that HEI offers me good support if I want to protect my intellectual property rights (IP)

3	Support instruments	Extent to which HEI offers specific instruments that support students, graduates and staff to move from idea generation to business	Availability of specific instruments that support students, graduates and staff to move from idea generation to business	Interview with Directorate of Business	What instruments is HEI offering that supports students, graduates and staff to move from idea generation to business? What are the results? What are the challenges?
			Availability of advisory board to help develop business ideas	Content analysis	D: Directorate of Business
			Availability of idea generation activities	Content analysis	D: Directorate of Business
			Availability of business pitch sessions where selected pitches can get funded	Content analysis	D: Directorate of Business
			Availability of a fund for market feasibility studies	Content analysis	D: Directorate of Business

Variable 4.3 Training is offered to assist students, graduates and staff in starting, running and growing a business.

	Indicator	**Full description**	**Measurement**	**Data collection method**	**Question (Q) or document (D)**
1	Business courses	Extent to which courses are offered that are important to successfully start and operate a business (like business opportunity recognition, change management, business finance, human resources and law)	Number and subject of courses offered that are explicitly aimed to support students (undergraduate and graduate) when starting-up a business	FDG with Faculty	Q: Which courses are offered that are explicitly aimed to support students (undergraduate and graduate) when starting-up a business? To what depth? (introduction, advanced)
			Perception of respondent whether courses offered that are important for doing business	Survey, Likert, 1-5 Students	Q: I find that HEI is offering courses that help me to successfully start or operate a business
2	Tailored entrepreneurship courses	Extent to which HEI offers tailored entrepreneurship courses across all subject areas and levels of study	Perception of respondent whether students can choose classes tailored to his/her specific needs and interest	FDG with: Faculty Students	Q: Do you think that at HEI the business start-up teaching is tailored to the interests of the students? In what form? What are the challenges? What are the benefits?
				Survey, Likert, 1-5 Faculty Students	Q: I find that at HEI the business start-up teaching is really tailored to the interests of the students

3	Entrepreneurship training recruitment	Extent to which HEI actively recruits students and staff to training activities and monitors the levels of engagement	Availability of promotional effort to recruit students into the entrepreneurship program	FGD with Top-management Faculty	Q: Are there any efforts/activities to promote the entrepreneurship program? Is this working? What are the challenges?
			Estimated number of internal announcements to promote business training program over the last 5 years	Content analysis	D: Communication bulletins, advertisements
			Numbers of external announcement to promote business training program over the last 5 years	Content analysis	D: Communication bulletins, advertisements
			Total number of students that participated in the previous academic year in entrepreneurship development programs, whether degree and/or non-degree	Content analysis	D: Organization record on number of students per entrepreneurship development course/program
			Perception of respondent whether business education program is well promoted	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that at HEI business start-up education is well promoted
			Perception of respondent whether students are actively recruited for the entrepreneurship program	Survey, Likert, 1-5 Students	Q: I find that students are actively recruited to participate in entrepreneurship programs of the university
4	Learning from entrepreneurs	Extent to which HEI involves entrepreneurs and key actors from the entrepreneurship ecosystem	Estimated number of classes/seminars/trainings given by entrepreneurs	FGD to students and faculty	Q: Can you give an estimate of number of guest lectures per semester?
			Perception of respondent whether there is enough opportunities to learn from entrepreneurs	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that the HEI offers enough opportunities to learn from entrepreneurs
5	Teaching methods	Extent to which HEI use up to date teaching methods focused on learning-by-doing and critical reflection	Type of teaching methods training for faculty over the last 5 year	Content analysis	D: Organization record on faculty training, Academic Affairs
			Number of faculty that participated in teaching methods training in the previous academic year	Content analysis	D: Organization record on faculty training, Academic Affairs

	Overview and experience of different teaching methods used	FGD with faculty	Q: What teaching methods do you use? Did you receive training on teaching methods? When? What about? Have you incorporated the new methods in class? What have been the challenges? What are the benefits? Have you ever reviewed it?
	Perception of respondent whether HEI is supporting faculty to ensure that teaching methods are current and appropriate	Survey, Likert, 1-5 Leadership Faculty	Q: I find that the university supports faculty sufficiently with training on interactive teaching methods
		FGD with Students	Q: what entrepreneurship courses did/do you take? Q: What is/are the teaching approach/es used in those courses? Q: Is/are the method can help you to start/run a business?
	Perception of respondent whether the teaching methodology is appropriate for business start-up education	Survey, Likert, 1-5 Students	Q: I find that the way of teaching entrepreneurship at HEI helps me to run a business
	Perception of respondent whether entrepreneurship program teaching methods are centred on learning-by-doing: case studies games simulation business visit	FGD with staff involved in business start-up support service / entrepreneurship education (to be specified)	Q: Do you stimulate doing-by-learning of the students? How? What are the challenges?

Variable 4.4 Mentoring: Mentoring and other forms of personal development are offered by experienced individuals from academia or industry.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Mentoring	Extent to which HEI organises visible, accessible and good-quality mentoring and personal development activities	Estimated number of business mentoring activities/year Users of business mentoring activities	Content analysis	D: Directorate of Business Development
			Estimated number of business mentoring activities/year Users of business mentoring activities	Content analysis	D: Directorate of Business Development
2	Training for mentors	Extent to which HEI actively recruit mentors and provide them with training, resources (e.g. IP assistance), formal recognition and rewards	Number of mentors	Content analysis	D: Directorate of Business Development
			Availability of training for mentors	Content analysis	D: Directorate of Business Development
3	Matchmaking of mentors	Extent to which HEI facilitates matchmaking of mentors and protégés	Number of matching events with mentors over a period of 5 years	Content analysis or Interview with Director Business Development	D: Directorate of Business Development
			Perception of respondent to what extent HEI provides matching events with mentors	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: HEI organizes sufficient matching events with business mentors
4	Peer-to-peer mentoring	Extent to which HEI provides opportunities for peer-to-peer mentoring where members help each other, such as entrepreneur clubs	Availability of opportunities for peer-to-peer mentoring where members help each other, such as entrepreneur clubs	Interview with Director Business Development	Q: Is HEI offer opportunities for peer-to-peer mentoring where members help each other, such as entrepreneur clubs What are the results? What are the challenges?

Variable 4.5 Access to private financing: The higher education institution facilitates access to financing for its entrepreneurs.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Education	Extent to which financial education is offered to entrepreneurs and potential entrepreneurs	Availability of financial education	Content analysis	Curriculum & program of extra-curricular entrepreneurship development programs (if any)
2	Start-up funding support	Extent to which support is offered to start-ups in seeking for funding	Availability of HEI funding support to start-ups of students, staffs and alumni: • university investment fund • access to an external fund • soft loans • collateral • joint venture with a bank • grants • crowd-funding	Interview with Director Business Development	Is HEI offering funding support to students, employees and alumni If yes, what kind of support? What are the challenges? What the benefits? If no, why not?
			Estimated amount of HEI fund offered for business start-up during the last 5 years	Content analysis or Interview with Director Business Development	Organization financial record
			Perception of respondent to what extent HEI provides funding (internal and external source) for business start up	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that the university provides enough access for financing business
3	Matching events with investors	Extent to which the institution is organizing matching events for start-ups with investors	Number of matching events with investors over a period of 5 years Perception of respondent to what extent HEI provides matching events with investors	Content analysis or Interview with Director Business Development Survey, Likert, 1-5 Leadership Faculty Students Externals	D: Directorate of Business Development Q: I find that the university organizes enough matching events with investors
4	Integrated approach	Extent to which access to finance is linked with training, mentoring and incubation	Availability of procedures that relate access to finance to training, mentoring and incubation	Interview with Director Business Development	Q: Please explain in what way HEI links facilitating access to finance with training, mentoring and incubation? What are the results? What are the challenges?

Variable 4.6 Access to business incubation facilities: The higher education institution provides access to business incubation facilities.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Access to business incubators	Extent to which incubator facilities and - services are available and accessible for staff, students, alumni, and others	YES/NO Existence of a HEI incubator	Content analysis	D: HEI Organizational structure
2	Services of business incubators	Extent to which HEI ensure that their incubators offer a full range of soft support (networking, mentoring, etc.) as well as physical infrastructure	Type of services offered at the HEI incubator, categories: • free or subsidized premises • access to laboratories • research facilities • IT services • Coaching • Mentoring • Training • Access to financing	Content analysis Interview or FGD with Director of Business Development & Interview with users of Incubator (if any)	D: Plan / reports of the business incubato Q: Does HEI have a business incubator? If no, why not? If yes, what services are offered? What is the most popular service? To whom? What are the challenges? What are the benefits? How many business have used the incubation over the last 5 years? What kind of users?
3	Promotion of business incubators	Extent to which HEI promote the incubator widely across campus and host events that engage potential entrepreneurs	Number and kind of users at business incubators	Content analysis	D: Directorate of Business Development
			Variety of users at business incubators	Content analysis	D: Directorate of Business Development
			Perception of respondent whether the services of business incubators are accessible for all	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that the services of the business incubator are accessible for me
4	Synergy	Extent to which HEI enhances synergy between incubation, research and education	Availability of procedures that facilitate relation between incubation and education and research	Interview with Director of Business Development	Q: Please explain in what way HEI enhances synergy between incubation, research and education? What are the results? What are the challenges?
			Perception of respondent on whether the HEI enhances synergy between incubation, research and education	Survey, Likert, 1-5 Leadership Faculty Students	I find that the HEI ensures good interrelation between incubation with education and research

27 indicators

Category 5: Knowledge Exchange and Collaboration

Variable 5.1 Collaboration and knowledge exchange with industry, society and the public sector: The higher education institution is committed to collaboration and knowledge exchange with industry, society and the public sector.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Knowledge exchange	Extent to which knowledge exchange with industry, society and the public sector is included in the institutional policy	Availability of knowledge exchange with industry, society and the public sector in the HEI policy	FDG with top-management	Q: In how far is it important for HEI to exchange knowledge with industry, society and the public sector? Is this embedded in HEIs strategy and operations? How is this organized at HEI? Can you mention best practices? Is cooperation with industry, society and the public sector reflected in HEI's research policy and activities? How? Q: Who are your partners in industry (big enterprises, SMEs, farmers/farmers group and business associations)? Q: How you organize your relation with them? Q: Who is in charge to organize your HEI relation with them? Q: What activities you do with them? Q: What knowledge/ information they share with you? Q: What knowledge/ information you share with them? Q: Who are your partners in community (non-business oriented community, religious organization, NGO)? Q: How you organize your relation with them? Q: Who is in charge to organize your HEI relation with them? Q: What activities you do with them? Q: what knowledge/ information they share with you? Q: What knowledge/ information you share with them? Q: Who are your partners in government (all tiers of government included)? Q: How you organize your relation with them? Q: Who is in charge to organize your HEI relation with them? Q: What activities you do with them? Q: what knowledge/ information they share with you? Q: What knowledge/ information you share with them?
			Perception of respondent whether knowledge exchange with industry, society and the public sector takes place	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that information or knowledge is widely shared between my HEI and industry (big enterprises, SMEs, farmers/farmers group and business associations). Q: I find that information or knowledge is widely shared between my HEI and community (non-business oriented community, religious organization, NGO). Q: I find that information or knowledge is widely shared between my HEI and government (all tiers of government).

2	Structure that support collaboration	Extent to which structures and instruments are in place for collaboration and knowledge exchange with industry, society and the public sector	Availability of organization structure that support collaboration and knowledge exchange with industry, society and the public sector	Interview with top management	Included at indicator 5.1.1
			Number joint university-industry centers, labs, educational programs and institutes	Content analysis	
3	Coordination of collaboration	Extent to which these relations with industry, society and the public sector are coordinated	Coordination within HEI structure to coordinate relationship with industry, society and the public sector are coordinated	Interview with top management	Included at question 5.1.1
4	Guidance	Extent to which guidance is given on how to develop and imple-ment all types of relations with the public and private sector	Estimated number of business mentoring activities/year Users of business mentoring activities	Content analysis	D: Directorate of Business Development
			Perception of respondent to what extent business mentoring activities for students/graduates exists	Survey, Likert, 1-5 Leadership Faculty Students	Q: HEI provides plenty of business mentoring

Variable 5.2 Active involvement in partnerships and relationships with a wide range of stakeholders: The higher education institution demonstrates active involvement in partnerships and relationships with a wide range of stakeholder.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Active involvement in partnership	Extent to which the institution is actively involved in partnerships	Estimated number of active partnership with various stakeholders over the last 5 year, categorized by private sector, government, local community, academics	Content analysis	D: list of HEI partners Organization record in public relation office, community outreach office
			Number of externally funded scholarships	tent analysis	
				Interview with top-management	Q: Do you have a partnership policy? What different kind of roles HEI plays in partnerships? What are the challenges? What are the benefits?
			Perception of respondent whether HEI is actively involved in partnerships with various stakeholders	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that HEI is actively building partnerships with industry. I find that HEI is actively building partnerships with community. I find that HEI is actively building partnerships with government. I find that HEI is actively building partnerships with NGOs.
2	Schools and colleges	Extent to which HEI supports entrepreneurship development of schools and colleges through networking and broader engagement	Availability of partnership with schools or other university for entrepreneurship/entrepreneurial agenda	Content analysis	D: Number and type of partnership with school or other university within the last 5 years
3	Monitoring and evaluation	Extent to which monitoring and feedback is provided of the mutual value developed through stakeholder relationships	Availability of monitoring and feedback from partners and stakeholders	Content analysis	D: Monitoring and feedback from partners and stakeholders within the last 5 years

Variable 5.3 Links with incubators, science parks and other external initiatives: The higher education institution has strong links with incubators, science parks and other external initiatives, creating opportunities for dynamic knowledge exchange.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Business park	Extent to which science and / or business parks exists	Availability of science/business park	Content analysis	D:Organization chart / record
			Number of companies in a university based technology park (science park)	Content analysis	
				Interview with the Director of Business Development / Park	What is the policy of HEI for business parks? What activities are undertaken? Since when? What has been the results? What are the challenges? What kind of benefits come from the business park? In terms of funding, education, research, community development?
			Perception of the usefulness of a science/ business park for the HEI	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: HEI's science-business park is useful
2	Exchange of knowledge at business park	Extent to which cross-fertilization of knowledge and ideas from science and business parks is taken place	Availability of ideas exchange in business/ science park	Interview with Director Business Development Park	Q: Who is involved in this business-science park? Q: Is it common for all who involved in this business-science park to share ideas? Q: What innovations come from this business-science park? Q: How do these innovations come to light/made into being?
3	Financial support for business park	Extent to which the institution has a financial and / or management interest in science parks and incubators, if any	Availability of fund for business/science park If available, percentage of fund used for business/science park	Interview with Director Business Development / Park	What are the financial modalities of the business park?
4	Monitoring	Extent to which the added value generated through linkages and cross-fertilisation is monitored	Availability of value added measurement	Interview with Director Business Development / Park	Is there any way to monitor/measure the value added that comes from exchange of knowledge at business park?

Variable 5.4 Opportunities for staff and students to take part in innovative activities: The higher education institution provides opportunities for staff and students to take part in entrepreneurial activities with business/the external environment.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Meeting event with external stakeholders	Extent to which staff and students can meet and engage with business or other external stakeholders	Number of business meet events per year in the last 5 year	Content analysis	D: Organization record from BLST office
			Perception of respondent to what extent opportunities to meet and engage entrepreneurship for students/staff exist	Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: HEI have events that enable me to meet business and other external people
2	Support of Mobility	Extent to which HEI support student/staff mobility through internship, sabbaticals, dedicated study program	Number of sabbaticals per year in the last 5 year	Content analysis	
			Percentage of undergraduate students performing 1 or more internships, previous academic year	Content analysis	
			Percentage of student internships at business enterprises (from total number of internships)	Content analysis	
			Availability of incentives/reward/ financial support given for staff for sabbatical	Content analysis	D: HR Policy
			Availability of (financial) support given for student internships	Content analysis	D: Student Affairs / Internship Policy
				FGD with Students	Q: Is HEI supporting internships? If so in what form?

Variable 5.5 Knowledge exploitation: The higher education institution integrates research, education and industry (wider community) activities together to exploit new knowledge.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Absorbing from wider ecosystem	Extent to which HEI have mechanisms in place to integrate and absorb information and experience from the wider ecosystem	Teaching material include experience gained from research and internship/sabbatical	Interview or FGD with faculty	Q: Do you include knowledge gained by research, industry, education, entrepreneurs and others in teaching materials? How? What are the challenges?
			Perception of respondent whether teaching material include experience gained from internship/sabbatical	Survey, Likert, 1-5 Leadership Faculty	Q: I find that the teaching materials include experiences gained from sabbaticals, internship or research
			Research carried out based on knowledge created and co-created by industry, sabbaticals, internships, and entrepreneurs	Interview or FGD with faculty	Do you base your research on existing knowledge gained from industry, sabbaticals, internships, and entrepreneurs? How? What are the challenges? What are the benefits?
			Perception of respondent whether research is carried out based on knowledge created and co-created by industry, sabbaticals, internships, and entrepreneurs	Survey, Likert, 1-5 Leadership Faculty Externals	Q: I find that the research is strongly based on experiences gained from industry, sabbaticals, internships, and entrepreneurs
3	Communication	Extent to which communication mechanisms exist between the HEI and the external environment for mutual benefit	Existence of structured, formal communication mechanisms between the HEI and the external environment	Content analysis + Interview with Top management and externals	What structured communication mechanisms exist between the HEI and the external environment? Do they operate successfully? What are the benefits? For whom? What are the challenges?
			Perception of respondent whether communication mechanisms exist between the HEI and the external environment for mutual benefit	Survey, Likert, 1-5 Leadership Faculty Externals	Q: Communication between the HEI and external stakeholders functions well for the benefit of all parties involved
4	Monitoring	Extent to which research activities are monitored to identify new and relevant knowledge	Availability of monitoring mechanism measurement	Interview with Director Research	Q: In what way is HEI monitoring research activities to identify new and relevant knowledge?

17 indicators

Category 6: Internationalization

Variable 6.1 Internationalization strategy: Internationalisation is a key part of the higher education institution's entrepreneurial agenda.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Being international	Extent to which the internationalization strategy is reflecting the entrepreneurial objectives of the university	Availability of strategy statement that shows 'internationalization'	Content analysis	D: HEI strategy
			Availability of common objectives and synergies between internationalization and the entrepreneurial agenda	Interview with top-management / Director of International Affairs	Q: What is your strategy towards internationalization? How do you stimulate staff and students to be more international? What are the results so far? What are the challenges?

Variable 6.2 International mobility of staff and students (including PhD students): The higher education institution explicitly supports the international mobility of its staff and students (including PhD students).

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	International mobility	Extent to which the institution is stimulating international staff mobility and under which conditions	Numbers of staff going abroad for academic and/or entrepreneurial purposes	Content analysis	D: international mobility document at international liaison office
		Extent to which the institution is stimulating international student mobility and under which conditions	Numbers of student going abroad for academic and/or entrepreneurial purposes	Content analysis	D: international mobility document at international liaison office
2	Stimuli for international mobility	Extent to which rewards and incentives are in place for international mobility	Availability of budget for international mobility	Content analysis	D: Budget of HEI
				Interview with top-management / Director of International Affairs	See Variable 6.2, indicator 1

Variable 6.3 International and entrepreneurial staff (including teaching, research and PhDs): The higher education institution seeks and attracts international and entrepreneurial staff (including teaching, research and PhDs).

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	International recruits	Extent to which international and entrepreneurial staff is stimulated to start working at the university	Numbers of international staffs (faculty, researchers, interns and PhD students) & Percentage of foreign staff at the university	Content analysis	D: list of faculties D: list of researcher D: list of interns D: list of PhD student at international liaison office
			Perception of respondent whether HEI has actively recruited international staffs (faculty, researchers, interns and PhD students)	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that HEI is good in attracting international staff.
2	Support system	Extent to which a support system is in place for the cultural integration of international staff	Availability of a support system: help desk, whether virtual or real officer for international staff support procedures	Interview with HR	Q: Do you offer support to international staff to facilitate integration, like a help desk? If yes, please explain What are the results? What are the challenges? If no, why not?

Variable 6.4 Internationalization in approach to teaching: The higher education institution demonstrates internationalisation in its approach to teaching.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	International curriculum	Extent to which the curriculum is internationally oriented	Perception of respondent whether the curriculum is internationally oriented	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that HEI prepares its students well for performing in an international context
2	International vibe	Extent to which the teaching and learning environment is tailored to a global audience	Activities undertaken to tailor the teaching and learning environment to a global audience, such as international exchange programs, Is teaching offered in English, international distance education, international campus initiatives	Interview or FDG with top management	See Variable 6.2, indicator 1
			Perception of respondent whether the teaching and learning environment is tailored to a global audience	Survey, Likert, 1-5 Leadership Faculty	Q: I find that HEI is good in attracting international students
3	International exchange	Extent to which international exchange programs are in place	Numbers of international exchange programs	Content analysis	D: international exchange program report at international liaison office
			Number of international students & Percentage of foreign students studying at the university	Content analysis	D: international exchange program report at international liaison office
4	International courses	Extent to which teaching is offered in English	Numbers of courses given in English Numbers of classes given in English	Content analysis	D: HEI curricula overview at Academic Affairs

Category 7: Measuring the Impact

Variable 7.1 Impact of entrepreneurial strategy: The higher education institution assesses the impact of its entrepreneurial agenda.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Measurement of entrepreneurial impact	Extent to which the impact of the institutional entrepreneurial strategy is measured	Availability of impact measurement	Interview with top management	Q: Is there a measurement for the impact of HEI entrepreneurial strategy? Q: How do you measure it? Q: Who measures it? Q: What happens after you measure it? D: What are the measurement results, if any?
			Perception of respondent whether HEI strategy has impact	Survey, Likert, 1-5 Leadership Faculty Students	Q: I find that HEI adequately measures the impact of its entrepreneurial strategy
				Survey, Likert, 1-5 Leadership Faculty Students Externals	Q: I find that I can see real results from the HEI entrepreneurial strategy
2	Review of entrepreneurial strategy	Extent to which evidence is used as a tool for reflection and review of the strategy and mission of the university	Availability of proper evidence taking Availability or regular review of strategy	Interview with top management	Q: Is there a review of entrepreneurial strategy? Q: How often is the review? Q: How you measure it? Q: What happened after the review?

Variable 7.2 Personnel and resources: The HEI regularly assesses how its personnel and resources support its entrepreneurial agenda.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Skills assessment	Extent to which skills / competencies are assessed in view of the institutional entrepreneurial agenda	Availability of a procedure to assess the skills / competencies of staff in view of the institutional entrepreneurial agenda	Interview or FDG with top-management	Q: Is there any procedure to assess the skills / competencies of staff in view of the institutional entrepreneurial agenda? If so, how does this work? How often? What are the challenges?
2	Entrepreneurial activities data collection	Extent to which entrepreneurial activities are assessed and compared across all faculties and departments	Availability of procedure to assess and compare entrepreneurial activities all over the HEI	Interview or FDG with top-management	Is there any procedure to assess and compare entrepreneurial activities all over the HEI? If so, how does this work? How often? What are the challenges?
3	Evaluation of assessment	Extent to which results are fed back into course renewal and staff development plans	Availability of procedure to renew courses and staff development plans based on assessment and comparison of entrepreneurial activities all over the HEI	Interview or FDG with Top-management Middle management (Dean / Department Heads)	Do you renew courses and staff development plans based on assessment and comparison of entrepreneurial activities all over the HEI? How? How often? What are the challenges?

Variable 7.3 Impact of entrepreneurship teaching and learning: The higher education institution regularly assesses entrepreneurship teaching and learning across the institution.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Entrepreneurship education assessment	Extent to which the impact of entrepreneurship education is measured at different phases of entrepreneurship education activities (beginning, end, point in time after)	Availability of measurement before-after comparison of entrepreneurship education programs	Interview with faculty teaching entrepreneurship education	Q: Do you measure the impact of entrepreneurship education? Of the level of knowledge, skills and competencies gained? Q: when you measure it? Q: what is the measurement based on? Q: who measures it?

Variable 7.4 Monitoring and evaluation of the impact of start-up support: The higher education institution regularly assesses the impact of start-up support.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Start-up assessment	Extent to which impact of start-up support is measured	Availability of procedure to measure impact of start-up support	Interview with Director Business Development	Q: Do you measure the impact of start-up support? How? How often? What are the challenges? How do you ensure that findings are fed back into the development of start-up activities?

Variable 7.5 Monitoring and evaluation of institution's knowledge exchange activities: The higher education institution regularly assesses knowledge exchange and collaboration.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Knowledge exchange assessment	Extent to which success criteria are defined in relation to knowledge exchange	Availability of proper knowledge exchange measurement	Interview with top management Interview with faculty	Q: What do you think about knowledge exchange Q: How far should knowledge exchanged? With internal stakeholders (mention each)? With external stakeholders? Q: What indicators of success do you use, like new research ideas generated, joint HEI-business projects and relationships formed, number of start-ups and spin-offs created?
2	External stakeholders measurement	Extent to which perception by external stakeholders on the institutional performance is measured	Availability of HEI performance measurement by each external stakeholders (industry-in-cluding farmers, government, NGO, parents, alumni, local people)	Interview with top management	Q: Do you have external stakeholders (mention each) measure HEI performance Q: What method do you use for external stakeholders (mention each) to measure HEI Q: What do you do with the result of such measurement

Variable 7.6 Internationalization: The higher education institution regularly assesses the institution's international activities in relation to its entrepreneurial agenda.

	Indicator	Full description	Measurement	Data collection method	Question (Q) or document (D)
1	Internationalization assessment	Extent to which the internationalization activities are assessed in view of the institutional entrepreneurial agenda	Availability of procedure to measure impact of internationalization activities	Interview with top management	Q: Do you measure the impact of the internationalization activities? How? How often? What are the challenges?
2	Review	Extent to which evidence is used as a tool for reflection and review of the internationalization and entrepreneurial agenda	Availability of proper evidence taking Availability or regular review of the internationalization and entrepreneurial agenda	Interview with top management	Q: How do you ensure that findings are fed back into the internationalization and entrepreneurial agenda?

11 indicators

Appendix II. Questionnaire for university staff

ENTREPRENEURIAL UNIVERSITY ASSESSMENT

Teaching staff & Leadership/Management Survey

Thanks for your willingness to fill-out this survey. This survey is part of a comprehensive entrepreneurial assessment of [NAME]. An international research team has the opportunity to explore what is being done at [NAME] with the aim of advising the leadership and faculty on how it could strengthen its entrepreneurial strategy, activities, facilities, and educational programs.

The study period will be [PERIOD] after which the final reports will be formulated and results can be shared with you.

Please note that your responses will only be used for this research purpose and used confidentially. In the reports, the data will be presented anonymously.

The research team

Huub Mudde, MSc, Maastricht School of Management

Staff and Management Survey on Entrepreneurial Universities

Please fill-out the following basic data:

Your position: .....

Your Department (if applicable): .....

Number of years at [NAME]: .....

Sex: Male / Female

I SEE THAT THESE CHARACTERISTICS ARE PRESENT AT MY UNIVERSITY:

Please mark X in the number that you find suitable where 1 is least likely to be present and 5 is most likely to be present

No	Staff and Leadership/Management	1	2	3	4	5
1	My university has an entrepreneurial vision					
2	My university has a strategy that clearly emphasizes the importance of entrepreneurship					
3	I am well aware of the my university's strategy on entrepreneurship					
4	The entrepreneurial elements of the strategy are a priority at my university					
5	My university is actively informing me about its entrepreneurial vision, objectives and performance indicators					
6	The entrepreneurship activities at my university are well coordinated					
7	The structure of my university is conducive for executing entrepreneurship activities					
8	The structure of my university is conducive for executing entrepreneurship activities with people outside the university					
9	There is large freedom at my university to pursue own activities and initiatives					
10	People at my university are stimulated to develop entrepreneurial or innovative ideas					
11	My university actively supports community development					
12	My university supports companies in all kind of ways, whether the companies are small or big, new or already well established					
13	My university's support has positive impact on regional (Province) development					
14	My university's support has positive impact on local (Municipality) development					
15	My university actively supports local cultural activities					
16	My university is sufficiently able to attract various sources of funding to run the university					
17	My university is investing a lot of money in entrepreneurship development activities					
18	If I have an entrepreneurial idea, my university is willing to invest in it					
19	I am stimulated at my university to study or work together with people from other departments or units					
20	Knowledge sharing is stimulated within my university					

21	It is stimulated at my university to share facilities as much as possible					
22	My university stimulates students and staff to work together for business development					
23	I am stimulated at my university to undertake research in a cross-faculty team					
24	At my university cross-faculty research is functioning satisfactorily					
25	My university finds it important to recruit people from diverse background (ethnicity, race, religion)					
26	My university recruits people with entrepreneurial background outside the academia (from private sector or NGO)					
27	Many employees of my university are taking initiative					
28	Many employees of my university have the capacity to make things happen					
29	People that contribute to the entrepreneurial agenda of my university have a higher status than others					
30	It is good for my career at my university if I take decisions intuitively					
31	It is good for my career at my university if I can identify opportunities					
32	It is good for my career at my university if I am innovative					
33	It is good for my career at my university if I am willing to take reasonable risks					
34	it is good for my career at my university if act with perseverance					
35	My needs are taken into account in the career development policy of my university					
36	Employee performance indicators are based on the entrepreneurial vision and strategy of my university					
37	My university provides appropriate training for me to be more entrepreneurial					
38	Staff that takes part in business activities are sufficiently rewarded by my university					
39	Staff that gets external research funding are sufficiently rewarded by my university					
40	Staff that develops an innovative study program are sufficiently rewarded by my university					
41	Staff that are creative in addressing community problems are sufficiently rewarded by my university					
42	I can easily develop new entrepreneurial activities or initiatives					
43	My university recognizes my ideas as mine					
44	I am rewarded sufficiently when I come up with new ideas					
45	My university recognizes my intellectual property as my own					
46	At my university, staff has sufficient possibility to get training on entrepreneurial teaching					
47	Students are given enough opportunities to give feedback					
48	Student feedback results in changes at my university					
49	Student organizations undertake entrepreneurship activities sufficiently					
50	My university has an active student entrepreneurship society					
51	My university undertakes beneficial relations with important players in business					
52	My university has a very useful network for students					
53	My university organizes enough student business competitions					
54	My university provides appropriate training for me to be more entrepreneurial					
	My university emphasizes the development of entrepreneurial mind-sets and skills of all of its students					
55	My university emphasizes the development of entrepreneurial mind-sets and skills of all of its employees					
56	Entrepreneurial learning outcomes are well measured in the degree program(s)					
57	External relations are well managed at my university					

58	My university is good in maintaining relations with its alumni, locally, nationally and internationally					
59	My university is good at maintaining relations with government					
60	My university is good at maintaining relations with chamber(s) of commerce					
61	My university is good at maintaining relations with community leader(s)					
62	Case studies and assignments are based on research findings					
63	Internal exchange of research findings is encouraged					
64	My university has good learning networks with other universities					
65	My university emphasizes entrepreneurship awareness for all of its students					
66	My university emphasizes entrepreneurship awareness for all of its employees					
67	At my university it is possible to combine my study or work with starting-up a business					
68	The attention for entrepreneurship in the media of my university makes me want to start a business too					
69	My university is actively informing me about entrepreneurship opportunities					
70	My university organizes many entrepreneurship events, such as a fair, expo, seminar, or conferences					
71	My university is offering an entrepreneurship program that supports students, graduates or staff to move from idea generation to business creation					
72	My university strongly supports the start-up of businesses					
73	My university offers me good support if I want to protect my intellectual property rights (IP)					
74	At my university the business start-up teaching is really tailored to the interests of the students					
75	At my university business start-up education is well promoted					
76	My university offers enough opportunities to learn from entrepreneurs					
77	The university supports faculty sufficiently with training on interactive teaching methods					
78	My university organizes sufficient matching events with business mentors					
79	My university provides enough access to business financing					
80	My university organizes enough matching events with investors					
81	The services of the business incubator are accessible for me					
82	My university ensures good interrelation between incubation with education and research					
83	Information or knowledge is widely shared between my university and industry (big enterprises, SMEs, farmers/farmers group and business associations)					
84	Information or knowledge is widely shared between my university and community (non-business oriented community, religious organization, NGO)					
85	Information or knowledge is widely shared between my university and government (all tiers of government)					
86	My university provides plenty of business mentoring					
87	My university is actively building partnerships with industry					
88	My university is actively building partnerships with community					
89	My university is actively building partnerships with government					
90	My university is actively building partnerships with NGOs					
91	My university's science-business park is useful					
92	My university has events that enable me to meet business and other external people					
93	The teaching materials include experiences gained from sabbaticals, internship or research					

94	The research at my university is strongly based on experiences gained from industry, sabbaticals, internships, and entrepreneurs					
95	Communication between my university and external stakeholders functions well for the benefit of all parties involved					
96	My university is good in attracting international staff					
97	My university prepares its students well for performing in an international context					
98	My university is good in attracting international students					
99	My university adequately measures the impact of its entrepreneurial strategy					
100	I can see real results from the entrepreneurial strategy of my university					

101. Please mention maximum of 3 events/milestones that – according to you – were important for making my university more entrepreneurial:

	Event/milestone	Year of the event/ milestone
1		
2		
3		

Thanks for filling-out this survey,
The research team

Appendix III. Questionnaire for students

ENTREPRENEURIAL UNIVERSITY ASSESSMENT

Student Survey

Thanks for your willingness to fill-out this survey. This survey is part of a comprehensive entrepreneurial assessment of [NAME]. An international research team has the opportunity to explore what is being done at [NAME] with the aim of advising the leadership and faculty on how it could strengthen its entrepreneurial strategy, activities, facilities, and educational programs.

The study period will be [PERIOD] after which the final reports will be formulated and results can be shared with you.

Please note that your responses will only be used for this research purpose and used confidentially. In the reports, the data will be presented anonymously.

The research team

Huub Mudde, MSc, Maastricht School of Management

Student Survey on Entrepreneurial Universities

Please fill-out the following basic data:

Your position: student

Your Major/Minor: .....

Semester number: .....

Sex: Male / Female

I SEE THAT THESE CHARACTERISTICS ARE PRESENT AT MY UNIVERSITY:

Please mark X in the number that you find suitable where 1 is least likely to be present and 5 is most likely to be present

No	Student	1	2	3	4	5
1	My university has an entrepreneurial vision					
2	I am well aware of the strategy on entrepreneurship of my university					
3	The entrepreneurial elements of the strategy are a priority at my university					
4	My university is actively informing me about its entrepreneurial vision, objectives and performance indicators					
5	The entrepreneurship activities at my university are well coordinated					
6	The structure of my university is conducive for executing entrepreneurship activities					
7	The structure of my university is conducive for executing entrepreneurship activities with people outside the university					
8	There is large freedom at my university to pursue own activities and initiatives					
9	People at my university are stimulated to develop entrepreneurial or innovative ideas					
10	My university actively supports community development					
11	My university supports companies in all kind of ways, whether the companies are small or big, new or already well established					
12	The support of my university has positive impact on regional (Province) development					
13	The support of my university has positive impact on local (Municipality) development					
14	My university actively supports local cultural activities					
15	My university is investing a lot of money in entrepreneurship development activities					
16	If I have an entrepreneurial idea, my university is willing to invest in it					
17	I am stimulated at my university to study or work together with people from other departments or units					
18	Knowledge sharing is stimulated within my university					
19	It is stimulated at my university to share facilities as much as possible					
20	My university stimulates students and staff to work together for business development					

21	My university finds it important to recruit people from diverse background (ethnicity, race, religion)					
22	My university recruits people with entrepreneurial background outside the academia (from private sector or NGO)					
23	Many employees of my university are taking initiative					
24	Many employees of my university have the capacity to make things happen					
25	I can easily develop new entrepreneurial activities or initiatives					
26	My university recognizes my ideas as mine					
27	I am rewarded sufficiently when I come up with new ideas					
28	My university recognizes my intellectual property as my own					
29	Students are given enough opportunities to give feedback					
30	Student feedback results in changes at my university					
31	My university encourages me enough to develop entrepreneurial mind-sets, behaviour and skills					
32	Student organizations undertake entrepreneurship activities sufficiently					
33	My university has an active student entrepreneurship society					
34	My university undertakes beneficial relations with important players in business					
35	My university has a very useful network for students					
36	My university organizes enough student business competitions					
37	Business competitions organized by my university are interesting enough to join					
38	My university emphasizes the development of entrepreneurial mind-sets and skills of all of its students					
39	My university emphasizes the development of entrepreneurial mind-sets and skills of all of its employees					
40	I perfectly understand the entrepreneurial learning outcomes of my program					
41	External relations are well managed at my university					
42	Case studies and assignments are based on experiences of business people, government officials or community leaders					
43	Business people, government officials or community leaders are regularly engaged in education, for instance as guest lecturers					
44	My university is good in maintaining relations with its alumni, locally, nationally and internationally					
45	My university is good at maintaining relations with government					
46	My university is good at maintaining relations with chamber(s) of commerce					
47	My university is good at maintaining relations with community leader(s)					
48	My university has good learning networks with other universities					
49	My university emphasizes entrepreneurship awareness for all of its students					
50	My university emphasizes entrepreneurship awareness for all of its employees					
51	At my university it is possible to combine my study or work with starting-up a business					
52	The attention for entrepreneurship in media of my university makes me want to start a business too					
53	My university is actively informing me about entrepreneurship opportunities					
54	My university organizes many entrepreneurship events, such as a fair, expo, seminar, or conferences					
55	My university provides me many opportunities to participate in entrepreneurial research projects					
56	My university offers me plenty of opportunities to take up an internship in business					

57	My university is offering an entrepreneurship program that supports students, graduates or staff to move from idea generation to business creation					
58	My university strongly supports the start-up of businesses					
59	My university offers me good support if I want to protect my intellectual property rights (IP)					
60	My university is offering courses that help me to successfully start or operate a business					
61	At my university, the business courses teaching are really tailored to the interests of the students					
62	At my university, business courses are well promoted					
63	Students are actively recruited to participate in entrepreneurship programs of the university					
64	My university offers enough opportunities to learn from entrepreneurs					
65	The way of teaching entrepreneurship at my university helps me to run a business					
66	My university organizes sufficient matching events with business mentors					
67	My university provides enough access to business financing					
68	My university organizes enough matching events with investors					
69	The services of the business incubator are accessible for me					
70	My university ensures good interrelation between incubation with education and research					
71	Information or knowledge is widely shared between my university and industry (big enterprises, SMEs, farmers/farmers group and business associations)					
72	Information or knowledge is widely shared between my university and community (non-business oriented community, religious organization, NGO)					
73	Information or knowledge is widely shared between my university and government (all tiers of government)					
74	My university provides plenty of business mentoring					
75	My university is actively building partnerships with industry					
76	My university is actively building partnerships with community					
77	My university is actively building partnerships with government					
78	My university is actively building partnerships with NGOs					
79	The science-business park of my university is useful					
80	My university has events that enable me to meet business and other external people					
81	My university is good in attracting international staff					
82	My university prepares its students well for performing in an international context					
83	My university is good in attracting international students					
84	My university adequately measures the impact of its entrepreneurial strategy					
85	I can see real results from the entrepreneurial strategy of my university					

86. Please mention maximum of 3 events/milestones that – according to you – were important for making my unmiversity more entrepreneurial:

	Event/milestone	Year of the event/ milestone
1		
2		
3		

Thanks for filling-out this survey,
The research team

Appendix IV. Documents, facts and figures

A variety of documents, facts and figures has been collected and analysed to compliment perceptions and information obtained in interviews and group discussion. The most important sources were (if available):

1. Leadership and Governance

- University vision/mission
- University strategy / multi-year plan
- University annual reports, last 2 years
- Organisational structure with explanation
- University communication instruments: website and corporate brochure
- Title and responsibilities of senior official(s) responsible for entrepreneurial agenda
- Composition of the University Board / Council
- Name, role, responsibilities of a coordinating unit for entrepreneurship activities, if existent
- Overview of formal relations with public and private sector in the region, if available

2. Organisational Capacity, People and Incentives

- University annual budget and expenditure
- Income sources over the last 5 year
- List of interdisciplinary mechanisms and structures
- List of cross-faculty teaching and research groups
- Information on availability and type of reward system for most entrepreneurial staff and students

3. Entrepreneurship development in teaching and learning

4. Pathways for Entrepreneurs

- Entrepreneurship development strategy / plan
- List of faculty and staff positions in the area of entrepreneurship
- List of student entrepreneurship activities/mechanisms
- List of multidisciplinary degrees
- List of transdisciplinary research and/or teaching centres focused upon societal issues
- Number of patents and licences and revenues received
- Description of entrepreneurship courses/programs, degree-based AND extracurricular (non-degree support and training)
- List of entrepreneurship development facilities and events
- Plans and reports of – if existent – incubator / innovation centre / entrepreneurship centre / science park / business park
- List of student entrepreneurship activities/mechanisms

5. Institution – Business/ External Relationships

- Course and program outlines: check whether placements/internships are part of this

6. Internationalisation

- Overview of international partners and programs
- Number of students and staff involved

7. Measuring the Impact

- University wide tracer study results over the last 3 years

Appendix V. Narratives of 14 university-graduated entrepreneurs

1. Abemelek

(date of interview: 23 April 2018)

Name of the company	Abemelek and Rebeca Poultry Farm
Type of business	Egg production
Years operational	2 years
Number of employees	3
Annual financial turnover (est.)	500,000 ETB (around 15,000 Euro)
Owner	Mr Abemelek
Age	27
Education	BSc Business Management, Bahir Dar University

Mr Abemelek, 27 years, started two years ago his poultry farm, Abemelek and Rebeca Poultry Farm outside Bahir Dar in Ethiopia. Rebeca is the name of his sister, but she is not involved in the business: her name is added because Ethiopian law requires at least two owners of a company I order to acquire land. When he was at high school, Abemelek had several friends who had their small business. They inspired him, but – being a good grade 12 student – he first went to university studying Business Management. After his study he worked for three years as a garment agent, but was not happy in this position. The payment was bad and he wanted to do something for himself. Farming is his hobby, his grandparents were farmers, and he started three years ago with 50 chicken at his home, financed by himself, family and friends. This evolved in his current business with more almost 1000 layers, serving a hospital and restaurants with eggs. There is a good demand and his business is growing. 'When I started my company, my parents were frustrated, because they did not want me to quit my job. They are government employees. Now they are positive because they see I can make a living.' Abemelek aspires to build the best agro animal industry in Ethiopia, from feed production to processing chicken meat.

Abemelek indicates that his university education helped him to know how to technically manage a business, but did not develop his business skills. In particular communication skills are according to him very important for doing business in Ethiopia. He learned a lot from his friends and from a short entrepreneurship training offered by the Ethiopia Entrepreneurship Development Centre (EDC). This course was for free, sponsored by UNDP. He thinks his best skill is perseverance. He managed to overcome many obstacles in setting up his company. In his view, the university should do more than only offering technical education: 'The university should focus more on how to build entrepreneurs, developing communication skills and learn students how to relate with business partners'.

2. Abraham

(date of interview: 22 April 2018)

Name of the company	Abraham Poultry
Type of business	Poultry
Years operational	5 years
Number of employees	15
Annual financial turnover (est.)	3 mln. ETB (around 90,000 Euro)
Owner	Mr Abraham
Age	46
Education	BSc Economics, Bahir Dar University

Mr Abraham, 46 years, is from a farmers' family. After his university study at Bahir Dar University (BSc Economics) he had several jobs, but soon realized that he wanted to start his own business. He saw that agriculture was prospering in his village and started to keep chicken in his home in the neighborhood of Bahir Dar, Ethiopia. This evolved in his current poultry company with a capacity of up to 8000 layers and broilers, 12 cycles a year, 15 workers and an annual turnover of around three million ETB. As a next step, Abraham wants to scale-up for which he will need a loan. Until now, his investments could be covered through two micro-credits and a loan from relatives.

When he started his company and quitted his job his family was totally not happy. But he worked hard, day and night, and his family noticed that it paid off and became supportive to him. Abraham is of the opinion that he did not really learn to become a businessman: 'it was already in me'. The university had brought him some basic knowledge, but not developed his entrepreneurial skills. He believes that he is a good business man because he is persistent, a good networker, flexible and willing and able to learn.

3. Ahsan

(date of interview: 14 July 2018)

Name of the company	CV Siaga Global Jaya
Type of business	Creative industry
Years operational	4
Number of employees	10 + 10 contract-based
Annual financial turnover (est.)	More than 1200 mln IDR (around 70,000 Euro)
Owner	Ahsan Abduh Andi Sihotang
Age	30
Education	BSc Agricultural Technology, IPB, Bogor

Ahsan, age 30 years, owns Siaga Global Jaya, a company that produces merchandise for events and conferences. 'Siaga' means 'we are ready to serve', 'jaya' means 'glory'. On the website, Siaga Global Jaya claims to be number one in Indonesia in company souvenirs (http://paketseminar.com). Siaga Global Jaya produces conference bags and takes care of the conference kit in the bag with the name and logo of the event printed on all the items. Ahsan created his company four years ago and business is going well. He has ten employees, another ten workers on contract base and his annual turnover is around 70,000 Euro.

The origin of his company goes back to the time he studied agricultural technology at the Bogor Agricultural University (IPB) in Indonesia. During his third year, he started to produce buttons for fellow students. Ahsan was active in several student organizations and realized that selling items for event promotion would be a business opportunity. He invested 2 mln IDR from his own savings (around 120 Euro) and diversified his products. Besides buttons, he offered among others key chains, mugs, and pens. Ahsan continued with this micro business until graduation, after which he started working for Toyota. He however soon realized this was not the right place for him. He felt caught within the formal, hierarchical culture of the company in which he was not able to develop himself and to be creative. Hence, he resigned and took up again his business in souvenirs for IPB students. In the next two years he offered all kind of services to students but struggled. He produced banners on demand, small merchandizing for student events, and opened a print shop for students. Ahsan memorizes that this was a very competitive market (he refers to it as a 'bloody market') with 20 booths servicing students in the same street. The business strategy was purely on price. This appeared not to be viable, and Ahsan went bankrupt. In hindsight Ahsan realizes that he also had too little product knowledge. Learned from his experience, Ahsan changed in 2014 his market from students to corporate industry and events. He continued producing the same, but for a more profitable market.

In order to finance his businesses, Ahsan only once got a loan. An alumnus from university whom he already knew from senior high school, invested 20 mln IDR (around 1200 Euro) in his printing shop. Unfortunately, he was only able to pay back half the amount to her. For Siaga Global Jaya he did not need an investor. It started small and has been growing organically.

Ahsan's business motivation originates from his youth. His parents were teachers in Makassar, had little means, and there was no entrepreneurship history in his family. Ahsan felt ashamed because he was poor, did not have the things his friends had, and he lacked confidence. So he decided that he did not want to become like his parents. He wanted to become a rich person and believed that the fastest way would be to become an entrepreneur. During his study he started his business with this money driven motivation, but that changed when business became more serious. He realized that this motivation had led him into bankruptcy and no joy. Motivated by the woman who had invested in his printing shop, Ahsan joined TDA, a national community-based network that stimulates and supports entrepreneurship (http://www.tangandiatas.com). He first was skeptical and thought it was just a talking club. But his mind changed, and the network has been very useful for him. He learned a lot from his fellow members. Once a month, he participated in a mentoring session, and just by informal discussions he got ideas. Soon he became active in the local organization and currently is the chair. Ahsan's business motivation has changed because of all these inputs. What drives him now is that he can help more people: himself, his family, his employees, and customers. Also he helps the community by outsourcing work.

The university has helped Ahsan indirectly. Technically, he learned some skills in his study, but the main contribution was outside class. Ahsan was very active in all kind of student organizations. Among others, he became the local chair of an international agricultural student association. He is convinced that this volunteering developed him strongly. He believes he is good at relation management, that he is persuasive, a good salesman and persistent. Furthermore, the university had given him the opportunity to join a business plan competition. He even won, but that business idea (corn milk production) never materialized. The university never gave him any advice on how to set-up a business. He just started by himself and learned by doing.

Although Ahsan likes what he is doing, he finds it challenging. He thinks that being in business is the most difficult profession. You have to be a good leader, dealing with employees among others, and you need to understand macro and micro economics: "It is never easy".

4. Aldi

(date of interview: 12 July 2018)

Name of the company	CV. DNA COKLAT (Chocofaza)
Type of business	Producing chocolate powder for drinks, chocolate bars, chocolate snacks
Years operational	3
Number of employees	6
Annual financial turnover (est.)	800,000,000 IDR/year (around 48,000 Euro)
Owner	Aldi Maulidiansyah
Age	26
Education	BSc Agricultural Technology, IPB Bogor

As of childhood, Aldi is fond of chocolate. Hence, it was obvious for him to enter the chocolate business when he decided to start a business. Aldi, together with his business partner Zaldi whom he knows from his study, produces chocolate powder for drinks, chocolate bars, and chocolate snacks. All the products are Halal. They sell online and via agents and resellers. Whilst Zaki is focusing on research and development, Aldi takes care of the overall strategy, finance and human resource management.

The business started as a course assignment in his third year of his study agricultural technology at the Bogor Agricultural University in Indonesia. Together with three other students, among which Zaki, Aldi had to come up with a project idea. He pushed for chocolate, and they came up with the idea to develop a chocolate drink with soda. Chocofaza was born. 'Faza' is composed of the first letters of the four students, and means 'lucky' in Arabic. Aldi saw business opportunities in chocolate, because he missed Indonesian chocolate products. He knew that Indonesia is one of the largest cocoa producers globally, but weak in processing.

Whilst the inception of Chocofaza was within his university education, he and Zaki continued testing their product outside the university. Because the soda drink appeared to be too complex, they concentrated fully on powder for a chocolate drink. They first bought with their own money cacao powder from East Java, but it appeared not to be good. Without money and cacao powder they had to be creative. They went to a fair, asked samples from suppliers, and starting experimenting in Aldi's bedroom. After eight months, their product was ready to sell. This was during his last year at the university. The university was of help in starting-up his business. His marketing teacher who taught him about market penetration, became his mentor. In addition, Aldi could do his final project of his Bachelor study on market development of dark chocolate drinks. Furthermore, Aldi and Zaki participated in a business plan competition of the university, and each received a grant of eight mln IDR (around 500 euro), money they used for buying supplies and paying their friend who built

their web shop. That was the only money received: beyond this grant, Aldi and Zaki have self-financed the company, investing their earning into its development.

Aldi is not raised in a business family, but taught himself how to run a business. In addition, he proactively had looked for a business man who could advise him. He found someone through Facebook who had a company in dim sum production and who was willing to share his experience. When asked about his strong points, he mentions his communication and networking skills. In addition, he has the creative mind and the innovative ideas, whilst Zaki is the one who knows product development. Currently, they are testing to replace sugar by stevia, which they can source from East Java. Aldi wants to go completely organic without artificial flavours. His dream is to have a chocolate factory, producing a variety of products from Indonesian cocoa only, sold in his own chocolate outlet.

5. Dadas

(date of interview: 10 July 2018)

Name of the company	Shushi
Type of business	Selling of seaweed
Years operational	Less than 1 year
Number of employees	3 co-owners + 12 seaweed producing partners
Annual financial turnover (est.)	Not yet: income until now is only 12 mln IDR
Owner	Muhammad Azhari Dadas
Age	21
Education	BSc Marketing, Udayana University, Denpasar

'It is my hobby to sell stuff', says Dadas, 21 years of age, and founder of Shushi, a company that sells seaweed and improves the livelihood of seaweed producers in South Bali (https://shushi.asia/home). Dadas is not from a business family, but at the age of 16 he started his first business. He invested his own savings to start online trading of skateboards. After he had studied the behavior of his young customers, he started to sell hoodies and other clothes they like. Everything was online, the business went well, but he felt not emotionally connected.

After senior high school, he moved from Jakarta to Denpassar and started to study Marketing at Udayana University. In 2019 he is expected to graduate. At his first year at the university, he was unpleasantly faced with the formal dress code of the university. With a creative mind, he came up with the idea to produce and sell fake collars that could be put on a t-shirt. He branded it 'Wearwiki'. Although his fellow students liked it very much, this business did not last, because production costs were too high and the profit margin too low.

Dadas' current business, Shushi, came into being around one year ago with support of a national startup development program. This National Movement 1000 Digital Startups (https://1000startupdigital.id) is run by an Indonesian private tech-startup ecosystem builder, supported by the Ministry of Communication and Information Technology. The ambition of the program is 'to create 1000 high-quality startups by 2020 with a total value of USD 10B.' As part of the government's vision to build Indonesia as 'The Digital Energy of Asia', the program aims to nurture digital startups through mentoring and capacity building.

At first, Dadas was not aware of this program. By change, he became to know of a pitching event in Denpassar and he decided to join. Around 20 people pitched an idea, and he pitched about e-commerce on fish. Only after the pitch, Dadas realized that it was a multi-level program with training, a bootcamp, and incubation. He participated in the full program, which lasted around four months.

The first step after the pitch was to create teams. Besides the pitchers, there were young software designers and software programmers. Dimas, designer, and Sukra, programmer, joined him: he did not know them before, but it worked out well, and they have become co-founders of Shushi. They first wanted to set-up an e-commerce in sweet water fish, but that did not work out. Their market research found out that most of the fish is imported to Bali from Java, and that it would not be viable for them to enter this market. Inspired by family connections of Sukra, they decided to move to seaweed instead. This business is catching-up. Dadas stresses the social aspects of the business. The seaweed producers are partners, not merely suppliers. Shushi is a vehicle that helps to link the producers with NGOs and government institutions for training and other support.

In his entrepreneurial endeavors, he got no support of his university, but also was not seeking it. He followed an entrepreneurship course but that was mainly theoretical. Recently, his university announced a new entrepreneurship development program with a business plan competition. Dadas is planning to join, because he would like to get the money: “I have the business, the idea, so I may win”. In his view, he really makes a change, because “although the hype of entrepreneurship is very big, in reality there are only very few students doing business”.

All Dadas’ businesses have been self-financed. Only at the time when he started selling hoodies, he borrowed some money from his mother which he repaid. When asking about what is important for an entrepreneur, Dadas stresses communication and networking skills, being able to deal with people. He learned this from experience. In addition, he pinpoints to the importance to be creative. Marketing is another crucial aspect of doing business according to Dadas. He acknowledges that the university is helpful in this respect, because of his marketing study. Furthermore, Dadas mentions that management and financial knowledge are also relevant, but he considers this as less important because he is of the opinion that one can learn this by oneself and software tools are available. He learned himself by watching videos on Youtube.

6. Haidhar

(date of interview: 12 July 2018)

Name of the company	Simha Group
Type of business	Hospitality Industry (food and beverages)
Years operational	5
Number of employees	300
Annual financial turnover (est.)	Confidential
Owner	Haidhar Wurjanto
Age	28
Education	BSc Management, IPB Bogor

Haidhar, 28 years of age, owns several restaurants, has a retail in cakes, and is entering the tourism industry as tourism operator and with an eco-park that is about to open its doors. Legally, the businesses are part of Simha Group. The start was in 2011 with Momomilk. At that time, Haidhar studied Management at the Bogor Agricultural University in Indonesia, and saw students drinking flavored milk that was sold by university staff. He realized it was a business opportunity, managed to get the recipe, did the packaging and branding, and opened a small booth at a busy junction in Bogor. The business went well, and one year later, Haidhar opened a second booth on the university campus. Initially, he sourced the milk from the university farm, but he moved to an external supplier when that appeared to be cheaper. Around 2013, Haidhar decided to further develop Momomilk. He was inspired by a successful milk restaurant in Yogyakarta, Kalimilk. He went there to see the format and he managed to get some insight information from staff. Next, he brought the concept to his own town, found private investors, and opened his first Momomilk restaurant. Currently, he has two Momomilk restaurants, three Momomilk booths, and a new restaurant chain, named Forestthree.

Momomilk was Haidhar's first viable business, after several business failures. At his seventeenth birthday, he asked his parents to give money instead of a present so he could invest in a first business. He started to sell Japanese food, but it failed. Next, he sold cell phone credit, became a reseller of Blackberry accessories, and sold fried rice. It all failed, but Haidhar is convinced that he has learned a lot. Looking back, he analyses that he failed because of lack of knowledge, lack of structure, too informal business partnerships, and because he wanted to earn money too fast.

Haidhars' business drive ignited in his teens. After nine years living in New Zealand, he returned to Bogor with his parents. His father had studied abroad, was civil servant, worked hard and was hardly at home. Haidhar wanted a different life than his parents, with more freedom and under his own control. He thought that becoming a doctor would do the trick.

But he changed his mind when he became to know the father of a friend. The father was often at home, playing with his children, and the family lived in a nice house. He appeared to be an entrepreneur, and from that moment on Haidhar decided to become one himself.

Haidhar has taught himself how to do business through self-study and learning by doing. First, he thought he had to be good at everything, but he learned that he better delegate and do what he can do best. Currently, the daily operations of his company are run by experienced managers, and he focusses on business development. In this process, the university was not actively supporting. His management study helped him to understand theory, but he developed his skills by himself. When at the end of his study his business became serious, Haidhar decided to graduate as fast and simple as possible: “I wanted to get it done. My GPA (grade point average) was low, but I did not care”.

Financially, Haidhar deliberately works with private investors that invested more than 3 billion IDR in his company. All of them are part of his inner social circle. He prefers this above formal bank loans, because these loans are not Halal. Haidhar realizes that he is strong in concept development and is able to convince others from his ideas. He thinks, talks and acts fast, in his words because “otherwise the opportunity get lost”. An example is also the way he is doing market research: he does this by himself, making quick assessments of the business by checking competitors, counting number of clients, and asking staff how much people spend on average. If this adds up positively, he builds his business case.

Haidhar loves what he is doing. He believes that he has local impact and it makes him proud that he is able to help others, with jobs and services.

7. Hendra

(date of interview: 12 July 2018)

Name of the company	Sugeng Jaya Farm
Type of business	Breeding mealworm
Years operational	1.5 years
Number of employees	3 co-owners + 5 workers
Annual financial turnover (est.)	Not yet: around 10 mln IDR/month
Owner	Koes Hendra Agus Setiawan
Age	22
Education	BSc Animal Science, IPB, Bogor

Hendra, 22 years of age, is about to finalize his Bachelor study in animal husbandry at the Bogor Agricultural University in Indonesia. Together with two fellow students, he owns Sugeng Jaya Farm, which means something like 'the farm of which we hope it will be successful'. The business, founded one and a half a year ago, is in breeding mealworms for animal feed. Their market research concluded that there are hardly any companies in West Java that produce mealworms, whilst there is a growing demand. Sugeng Jaya has three products. First, they sell life mealworms through a reseller to fishermen. Second, under the name of King Worm, they sell dried mealworm in all big cities of Java through several resellers. Their product is used as feed for songbirds and fishing. Their most innovative product is Pelletkuh, grains made of pressed and dried waste of mealworm breeding. This product is still in a prototype phase, but promising. It is rich of proteins and as such very suitable as feed for ruminants.

Hendra is the entrepreneur of the three friends, raised by parents who had their own, small poultry farm. Already as a kid at primary school he helped his mother selling cake. As teenager he started to sell small animals, like rabbit, bantam chicken, and pigeons. He managed to finance his own schooling as of being a teenager as well as his entrance to the university. With his hobby in animals, it was a logical choice for him to enroll at the Faculty of Animal Sciences of IPB.

Already in 2016, at the end of his second study year, he came up with the idea to start a business with mealworm because that would not need big investments. The teacher inspired him, and the dean of the faculty stimulated all students to come to him if they would have a business idea. He offered support, like facilities and research.

As of that moment, Hendra started to build his company. The teacher became his mentor and even invested privately. She stimulated him to first do research for which the university made facilities available. He carried out this research as part of his Bachelor study. Supervised by his teacher, Hendra improved the breeding process and the quality of the products. In

this process, two fellow students joint him, stimulated by the university in which team work is promoted.

Sugeng Jaya Farm is located at the research facility of the university. Currently, Hendra and his friends are preparing for scaling up the business from 1000 kg per two-months breeding cycle to 7000 kg per cycle. In order to make this happen, they will go to another location in the region. The unit on campus will continue, also after their graduation. New students will run this facility, to be used for testing, education and promotion. Hendra and his friends are currently repaying IPB for making use of the facilities. It is foreseen that they will enter into a formal profit sharing contract with the university.

Financially, Hendra has played it cleverly, making use of the opportunities given by the university. In 2017 he participated in the Student Entrepreneurship Program (Program Mahasiswa Wirausahan, PMW) of the university. This program aims to support IPB students to develop into successful entrepreneurs by providing capacity building, business mentoring, and entrepreneurship coaching. It included several weekend-based entrepreneurship training workshop at the university, after which he had to submit a business proposal. Hendra won 6.5 mln IDR (around 400 Euro) and was selected by his university to compete on national level. He subsequently won the national competition as well, which resulted in a grant of 12.5 mln IDR (around 750 Euro). His teacher mentored him in the process.

In 2018, he again participated, this time with Pelletkuh as his new business idea. Again he won, and got a grant of 22 mln IDR (around 1300 Euro). In parallel, he managed to acquire a grant from the Mandiri Sharia Bank, which promoted social entrepreneurship at his university. This grant is a combination of covering tuition fees, a monthly allowance, and a considerable grant once graduated (50 mln IDR, around 3000 Euro). Hendra and his friends invested all the money in developing Sugeng Jaya.

Another important contribution of the university to his business is that it gave him the possibility to link with alumni. Hendra has met several alumni who advised and inspired him. Most recently, after he had promoted his company through Youtube, an alumnus reacted. He offered a considerable loan and non-used buildings which they could use for their production. Within a few months, they are planning to start at this location.

When asked about his skills, Hendra emphasizes that his business started as a hobby. As a student, he had the opportunity to network and improve his business. He thinks that he has strong negotiation, relation management, and communication skills, which he developed over time.

8. Kartika

(date of interview: 31 Aug 2018)

Name of the company	Surya Mitra Farm
Type of business	Poultry (broiler)
Years operational	2
Number of employees	6
Annual financial turnover (est.)	2 bln IDR (around 115,000 euro)
Owner	Kartika
Age	26
Education	BSc Agribusiness, IPB Bogor; MSc Management, IPB (not yet graduated)

Kartika (26 years) is the proud owner of a poultry broiler company, Surya Mitra Farm, in Banyuwangi, East Java. She produces 100,000 heads per cycle of 35 days, mainly for the local market and for Bali. Bali is nearby, across the sea. Her business model is that she works with small farmers who source to her. Currently, 36 partners deliver 80 per cent of her volume. The rest she produces on her own farm. Kartika indicates that the demand is very high, in particular from Bali. She is trying to enlarge her own farm, making her less dependent on her partners.

Kartika likes being a business woman: her eyes are glowing when she talks about it: "I can manage my own schedule, it is more flexible. It is also more challenging, but it results in more revenues".

Originally, the farm was from her father who started the company in 2007. He worked with much more small farmers and was geographically less focused. She took over the company in 2017 when her father passed away: her sister was far too young to take over the farm, and her elder brother had a good job.

Her father has been an important example for Kartika. In the past, when he was general manager in a company, he had hardly any time for his family. But that changed in 2007, when he became entrepreneur and started the poultry business: "The family welfare increased, but most importantly, my father had more time for us. Hence, I decided that I wanted to become a business woman." Kartika's mother is a teacher. More recently, her father learned her business skills. "You do not learn price negotiation at the university. I learned this from my father and from my fiancé." "I think that my best skill is that I am meticulous. I also dare to take risks and take the responsibility of the results".

In preparation to a business career, Kartika studied Agribusiness at the Agricultural University Bogor (IPB). She aimed to get more technical background. She is however certain that this

study was hardly helpful in preparing her for her business. “No, the study was of no help for starting my business. The study was only text book based, and the teachers did not know how to do business themselves. I have not learned my business skills at the university.” Only her final Bachelor project was helpful, because it was a feasibility study on broiler chicken: “Because of this study I knew about the break-even point and could make a good assessment of the revenues of my business partners”.

After her graduation in 2014, Kartika worked one month in Jakarta, quitted the job because the salary was too low, and started to work with her father. In the meantime, she had met her husband who worked in animal husbandry. Soon they started to think about starting their own business, and in 2016 they started with a company for feed production. Her husband knew the sector, suppliers and demand which made it a logical choice. Initially, the family of her husband gave some small financial support, but later her father contributed more substantially, allowing them to invest and grow the business. The business is running well, with an annual turnover of around 2 bln IDR (more than 100,000 euro). Since 2017, when Kartika took over the business of her father, the business is fully run by her husband alone.

9. Michael Araya

(date of interview: 9 June 2018)

Name of the company	Zion Soap and detergent Manufacturing and Sales Blc
Type of business	Soap and detergent production
Years operational	1.5 years, license received in August 2017
Number of employees	4 (of which 1 full time)
Annual financial turnover (est.)	Not known: not yet a full production year
Owner	Mr Michael Araya & business partner
Age	35
Education	BSc Public Health, Alkan Health Science College

Michael (35) started his soap and detergent manufacturing with his business partner less than two years ago. They produce liquid soap for laundry, dishwashing, and washing of hands. Recently, they started testing the production of bars of soap. The company is still small, with one full time sales employee and three part-time employees for the production. Their clients are mainly from the surrounding neighborhood. He and his partner also still have a part-time job next to their business. The idea of starting this business originates from his study in Public Health (at the Alkan Health Science College in Addis Ababa). Because of his education, he knew that the WASH sector (Water, Sanitation and Health) in his country is the least developed and realized that that was an opportunity. He figured that if he could produce affordable products, people would start using it.

After his study, he did not start his business immediately, but worked among others as project coordinator at 'Safe your Generation', a local NGO working with youth on health issues. Michael was assigned to open a new branch of the NGO in the south of the country (Jinka). He learned to manage an office, to work with government, and to recruit and deal with staff. At that time, in his capacity as NGO staff, he had to organize an entrepreneurship training for youth. Although he was not participating in this training himself, the idea to start-up a business ignited. He started to educate himself, bought a book on doing business and read many magazines. He realized that not so many businesspersons had entered in manufacturing. He became to know that soap is easily to be manufactured, but mainly imported from China. He saw the opportunity of producing soap against a lower price for low and middle-income households, and discussed this with his friend, his current business partner. They decided to do a trial and to test their soap among friends and at some shops. The feedback received was positive enough for them to start the business.

The initial investments were limited. They could start the business with their own savings and Michael's brother, who owns a metal workshop, helped him freely in constructing

equipment. Later they added more savings and managed to get a loan of 30,000 ETB (around 950 Euro).

Michael strengthened his business skills by doing training at the EDC, the Entrepreneurship Development Centre in Addis Ababa. This UNDP funded organization offers free training and consultancy. First, he followed a six days entrepreneurship training, followed by a management skills training of around six weeks. This training covered the topics business start-up, Business Operations and Human Resource Management, Marketing, Finance and Accounting, and Business Plan Development. After the training, an EDC trainer continued to provide him business advice.

Michael's drive for being his own boss is that he can experience the fruits of his own efforts. He mentions that when he was working as an employee, all kind of issues influenced his results negatively, in particular decisions of his bosses. He is not the first in his family who runs a business. Besides his brother with the metal workshop, his mother used to have a private health clinic. Michael acknowledges that it is hard work, but he really likes to be a businessman. He thinks that to be successful in business, one has to have a good vision and work hard on achieving that. He believes he has such a vision, and hopes that with his strong planning skills he can achieve his dream of running a big, prosperous company.

10. Moges

(date of interview: 20 April 2018 + 7 June 2018)

Name of the company	Synergy Habesha Films and Communication
Type of business	Documentary and communication materials production
Years operational	8 years
Number of employees	20
Annual financial turnover (est.)	8 mln. ETB (around 240,000 Euro)
Owner	Mr Moges
Age	41
Education	PhD Social Work

Mr Moges is founder and owner of 'Synergy Habesha Films and Communication' that strives to empower the community through media. Located in Addis Ababa, Ethiopia, Synergy Habesha produces documentaries, tv and radio programs, organizes events, and develops communication materials. With around 20 employees he serves international donor agencies, NGOs, as well as bigger Ethiopian organizations. For instance, his company produces all materials of the Ethiopian Ministry of Health. Moges' ambition is to build his own production studio and grow his company 'spearheading exposing African culture and identity through Pan-African films and documentaries'. Founded in 2010, the company has been growing from year to year, investing revenues back in the company. He thinks that his strong points as entrepreneur are that he brings something unique, merging social work with media. And that he is fascinated by ideas.

The start of Moges' career was however troublesome. After his first university degree (in agricultural engineering), he worked in a remote area in the north of Ethiopia and became very unhappy. He felt misplaced, disconnected from the dynamic life in capital and the emerging internet. Already after six months he quitted his government job and came back to Addis Ababa where he started to teach English to earn some money. Through voluntary work at a French foster parents NGO he became familiar with documentary making which changed his life completely. He got inspired and appeared to be a fast and ambitious learner, which resulted in jobs by the French and by US NGOs and an emerging international network. At that time, he started thinking about setting-up his own business. Through his NGO network, Moges became aware of the start of a new MSc Social Work supported by the University of Illinois at Chicago, enrolled, and specialized in combining social work with media. Subsequently, he even did his PhD, self-sponsored.

In his first year of his Master study, Moges started his business, on part-time basis and with only 300 ETB (around 10 Euro). 150 ETB was already needed for buying the business license. He had no office and no people working with him. His first client was a fellow student who was also country director of an NGO. He made a documentary for him, and used the down

payment for renting equipment. He paid one of his other fellow students to be his assistant: this man continued working with him and is now one of his Board members. His second documentary was about the new study he was doing himself. The American professors were pushing him to make this and all expenses were covered by the university. His work was well received and even awarded by the University of Illinois at Chicago. This documentary helped Moges a lot, because it gave him the affirmation that he could do this, the President of Addis Ababa University wrote him a good recommendation letter, and it paved the way for his third documentary, for the University of Dar as Salaam in Tanzania. This university was part of the international partnership underlying the new Master in Social Work.
During his PhD, Moges continued to work part-time on his business. In hindsight, he regrets that he started slowly, but he understands he did so because he was not confident enough at that time and had no experience on how to build-up a company. In the beginning, running his own business was difficult. He did not have money for hiring staff, hence had to work with consultants, and he had to set-up the business and internal management by himself.
His breakthrough came when he won a bid from Handicap International. He deliberately offered a low price in order enter the market. He did everything by himself and his house was his studio.

Moges realizes that his first university degree did not help him in any way for starting up his business, contrary to his study in social work. As social worker he had learned from international professors how to negotiate, advocate, mentor and empower, skills that were useful as entrepreneur. His PhD supervisor, leading a research institute in the USA, even taught him how to manage staff. Although Moges is not from a business family, with his father being a military man, many of his close relatives started a business at the same time as he did. His sister, being a university drop-out, owns a big garment company, his elder brother owns a restaurant, and his wife organizes events and festivals. Moges believes that the interest of doing business has always been in him: “When people talked about their own business, I was always listening. These days, when I hear from people wanting to start, I cannot keep silent, and have to give advice”. The most important for starting a business is according to him an internal drive, an ambition and determination to start a business now. Although Moges really likes to be a businessman, he is also honest to admit that life is not always easy. He indicates that he has to work hard, day and nights, as well in the weekends, that it is difficult to fire and hire the right people, and that it involves a lot of paper work and bureaucracy. He likes the most the creative part of the work, and hence is happy that he is now in a position that he could recently hire a CEO.

11. Okom

(date of interview: 15 April 2018)

Name of the company	Okom Agricultural Investment
Type of business	Agricultural production
Years operational	10 years
Number of employees	18 & 150 seasonal workers
Annual financial turnover (est.)	3 mln. ETB (around 90,000 Euro)
Owner	Mr Okom Ojuwato Okok
Age	38
Education	BSc Procurement and Supply Chain Management

Mr Okom Ojuwato Okok is a charismatic successful business man with a farm, hotel and cafeteria, as well as a spiritual leader of a local church. Okom strongly beliefs that not capital, but vision and commitment is important to succeed in life and in business. He considers himself as an educator and role model for the youth in his local community: 'When I started, there was no business in the place I lived. I was the first one. Now young people have a reference to me. I want to encourage people to be strong in their vision, because on that you can build a future for yourselves and the country'. He believes that everything is possible, 'but you need to walk'.

Okom is raised in a poor, big traditional Anuak family in the rural area of Gambella in western Ethiopia. As the first in his family he went to university after which he became government employee and subsequently worked as local coordinator of an international environmental NGO. At that time he participated in a UNDP-funded training on basic business skills and started his agricultural business on part-time basis with 10,000 ETB (around 300 Euro). Now, more than ten years later, he owns a farm of 500 hectares outside the little town of Abobo, growing maize, sorghum, soybeans, sesame, and some cotton. When he quitted his job, people did not understand him and complained. But he continued, because 'there was something in me that pushed me to work in agriculture'. He is proud that he can now take care of his mother and that he is not dependent anymore.

Three years ago, Okom started a new business: he opened an 18-rooms hotel in Gambella town and a cafeteria with a unique service. The hotel is named Makdel which means 'strong'. The cafeteria is the only place in town that serves the traditional Anuak dish of Nile perch with maize porridge. Furthermore, he is the only cafeteria that is doing delivery. Currently, he is expanding with two meeting halls and a VIP room. Okom combines this new, unique business concept with being a social entrepreneur: in his cafeteria, young Anuak people have a job and he has set-up a fisherman association in his home village. He sources every early morning fresh fish for his cafeteria from this association. He has helped the fisherman to organize themselves, granted them a boat and some fishing gear, arranged a schedule

with nightshifts during which the fish is caught, and is offering a guaranteed price for the fish.

In his view, creativity and customer orientation are his strongest entrepreneurial skills. He did not learn these skills at university, but his study in commerce helped him in running a business. In addition, he has learned from teachers and friends that started a business and shared their experiences with him. Currently, he is studying again, MBA, to strengthen his business and management skills and knowledge. He finds that the university in town is increasingly doing good work by serving the community, but beliefs that faculty of the university needs to work more with the local farmers to help solving their problems.

For the future, Okom has more plans for the development of Gambella. He wants to set-up a good hospital and a private school.

12. Rizky
(date of interview: 13 July 2018)

Name of the company	Soka Farm House
Type of business	Rabbit breeding
Years operational	1
Number of employees	0
Annual financial turnover (est.)	3 mln IDR/month (around 200 Euro)
Owner	Rizky Maulana Munirul
Age	22
Education	BSc Animal Sciences, IPB Bogor

Rizky has almost finalized his Bachelor study animal sciences at the Bogor Agricultural University in Indonesia. Together with two fellow students, he owns Soka Farm, a small rabbit breeding company. Soka is the name of the street in which the farm is located and is the name of a flower. Around one year ago, Rizky started with a few rabbits because he knew that rabbit breeding was not so well developed in Indonesia. He soon became to know that two fellow students (Agus and Dodi) also were breeding rabbits. For them it was more a hobby, and they decided to join him.
Soka Farm sells life animals to be used as pet or for research, and carcasses for the meat industry. The business is growing and they are planning to start their own sausage processing next year. They practice the concept of integrated farming by doing business in food, feed and manure. Currently, Rizky is developing a partnership with sweet potato farmers: the rabbits eat the leaves of the potato plants, and the feces of the rabbits can be used again as manure for the plants. Furthermore, the company has a social mission. Part of the revenues are used to finance training to farmers and subsidizing the manure.

Rizky is the business men of the three students. Dodi has more expertise in breeding, Agus in meat processing. When Rizky was 18, he became member of an association of young entrepreneurs. Through this community network, he learned a lot from mentors and started several businesses, the one more active than the other. He owns a small sheep fattening farm with 15 sheep, produces honey in partnership with a farmer, and sells online bags and handicrafts from coconut fiber. The latter business is derived from his family network of which some members work in fashion. Rizky uses the profits from one company to invest in the other.

His parents are not in business, but have always supported him. Rizky likes to be a business man, because that gives him the possibility to develop himself. He believes he is strong in concept and business development, finance, and negotiation and communication skills.

Rizky is of the opinion that the importance of business is the mindset: “You need to be willing to learn by trying and error, to struggle and not to give up”.

The university has helped Rizky in starting-up Soka Farm: “If a student is active, he or she gets support from IPB. But if he or she is passive, there is no support”. Supported by his teachers, he joined a business plan competition (at that time for his honey business) and got a grant of eight mln. IDR (around 480 Euro). In addition, IPB helped him with buying Chinese equipment. The university took care of the money transfer, because he did not have a bank account. Unfortunately, the prototype appeared not to be successful. Furthermore, Rizky managed to spend his community service, a compulsory component of his study, on doing business. He was however not allowed to focus his final project of his Bachelor study to a topic that was related to his business interest. Recently, he and his two fellow students participated in two other business plan competitions. One by the university, and another one organized by the Ministry of Education through the university. His teachers first made him aware of these possibilities and helped him to develop the proposals. They won a grant of 20 mln IDR (around 1200 Euro).

Another support by the university has been through its vast network. Soka Farm is located at a private house of a university teacher who is living somewhere else for a few years. In return for taking care of his property, they use his place to breed rabbits. In addition, this teacher is mentoring them and is giving access to his network. He mas many useful contacts because he is consultant in meat production. Furthermore, IPB alumni tend to support each other and linking up to them is relatively easy. Through this network, Rizky became to know of an IPB alumnus that started a few years ago with rabbit breeding. He offered them to relocate to his place and to join him. They may do so.

13. Selamawit Damtew

(date of interview: 9 June 2018)

Name of the company	Sapphire Ethio
Type of business	Leather bags and accessories
Years operational	Less than 1 year (2 years including previous company)
Number of employees	0
Annual financial turnover (est.)	144,000 ETB (around 4,400 Euro)
Owner	Selamawit Damtew
Age	38
Education	BSc Business Management Bahir Dar University (distance education)

As a child, Selamawit liked to paint and design and wished she could do that for a living. Now, at the age of 38 her dream is coming true. She started her company 'Sapphire Ethio' on leather bags and accessories for the high-end market in Ethiopia and for export. At this stage, Selamawit is doing everything by herself. But when the business will grow, she will recruit employees for doing the sewing (or outsource it) so she can focus on designing and customer relations.

Selamawit has strategically chosen the location of her workshop in the proximity of several Embassies and persistently works towards making her business a success. Although her workshop is tiny, her bags cannot be missed when approaching the building. She has managed to link with wives of Ambassadors, who can afford to buy her products. And she has been to Germany to seek customers and promote her products, a visit she had organized by herself after she had been in contact with a German woman that worked in Ethiopia. It was a huge learning experience for her and a good example of her drive and selling skills.

Selemawat wanted to be a businesswoman for a long time, but when she was young she had no money and it was not accepted by her parents: "My parents firmly believed that I would be successful in life if and only if I would pursue an academic study instead of involving in designing. They didn't know much about entrepreneurship". Her uncle who raised her as of childhood, supported her education, but was not in favor of her professionalizing her design skills. So she stopped that and started working in his pesticide business: "My family wanted to influence my life and gave me no opportunity to practice my real interest". A diploma for secretary was her ticket towards economic independence. She worked several years as secretary and as marketing officer and started consistently towards preparing herself for doing business. For Selemawit, this has been a careful and consciously step-by-step process. She fulfilled a part-time university study Business Management at the age of 33, which helped her to understand international business theoretically. In addition, she used her free time to explore business opportunities, to get to know the leather sector, and to try-out

some products. And some two years ago she quitted her job and opened a small gift shop to actually experience the business environment. This shop has now evolved in her 'Sapphire Ethio' leather business.

Her work experience as marketing officer in a private company has helped her a lot. In that position, she had developed her business skills, in particular in sales and negotiation. In addition, she had participated in international bidding processes, which she could use to her advantage when dealing with foreigners.

Recently, Selemawit got support from the Ethiopian Entrepreneurship Development Center (EDC). An advisor of EDC has helped her in preparing a business plan for a loan of 200,000 ETB (around 6,000 Euro). She will use the money as working capital, among others to buy a new sewing machine.

Selemawit is a happy person now. She expressed that she loves the work she is doing and that is it very rewarding for her to create her own bags and to sell them. The price she has to pay is her own time, dealing with ever changing bureaucratic procedures, and – for the time being – paying rent for the workshop with too little income. But she is confident that that will change soon.

14. Zeamanuel Abera & Tabor Nekatibeb
(date of interview: 9 June 2018)

Name of the company	Simplatec IT Solutions
Type of business	Social media management and website development
Years operational	Less than 1 year
Number of employees	0
Annual financial turnover (est.)	Net yet known
Owner	Zeamanuel Abera & Tabor Nekatibeb
Age	21 (Zeamanuel) & 22 (Tabor)
Education	Bsc Engineering Addis Ababa University (not yet finalized)

Zeamanuel (21) is running a small IT company with his friend Tabor (22). Both are still studying engineering at Addis Ababa University and know each other from high school. At that time, they teamed up when they realized that they both enjoyed working with computers, and were starting to do some freelance work. Around a year ago, they realized they had better legalize their freelancing, mainly because that would allow them to participate in tenders. They rented a small office, because that is legally required, named their company Simplatec IT Solutions, and are about to receive their business license. They provide social media management services for companies, and develop websites.

Zeamanuel and Tabor are creative minds: they created the cartoon Abe and Kebe, two characters that make jokes. The Facebook page of 'Abe na Kebe' is very popular, with 1.2 mln. followers, and they are starting earning money out of it. People can subscribe to a daily sms service of one ETB for receiving the joke of the day.

For them it is not easy to start-up the company. Zeemanuel indicates that they have to deal with a lot of bureaucratic procedures, complex tax issues and paper work, which affects their creativity. They have to learn everything through the process, and luckily get some help from friends. Despite these issues, Zeamanuel and Tabor love to do their own thing. Zeamanuel is positive that he does not want to be employed. He indicates that it requires much more commitment to be his own boss, but it is worth it. Not the least because the earning is better. In his family, he is the first who started a company. Tabor's family had more experience in doing business already, with his parents running a health clinic and his elder sister a restaurant.

The university has been very helpful for Zeamanuel and Tabor in starting their business. Zeamanual refers to many inspirational speeches of experienced people who came to the university. He also explains that they participated in two business plan competitions, one organized by the Ministry of Science and Technology (promoted via the university), and

one organized by the university itself. In the competition from the Ministry, they ranked second and received a grant of 50,000 ETB. They won the university competition and were rewarded with a full scholarship for a Master program at the Addis Ababa University. They however get no support for their teachers, but also are not seeking for this. They have not informed their teachers about their company endeavor, and in a creative, but secret way, use their internship for working at their company.

Appendix VI. Overview of quantitative indicators

In 2018, I have analysed studies in search of non-perception based indicators that could be used to measure input, throughput, output or outcome of an entrepreneurial university. In this meta-analysis, 101 peer-reviewed articles on entrepreneurial universities indexed in two EBSCO databases were examined, complimented by 11 purposefully selected articles based on the literature review of the four empirical studies in this dissertation. In addition, quantifiable indicators as described by the international working group on Global Entrepreneurial University Metrics (GEUM) were added (Etzkowitz et al., 2017).

The following guidelines were used for the selection of indicators: i) availability, using existing data where possible; ii) efficiency, using existing university procedures to generate data; iii) simplicity, without the need for complicated mathematical calculations; iv) comparable, non-perception based; and v) scalable to total number of staff, students or other. This resulted in 280 non-perception based indicators that were found in 21 articles. Subsequently, indicators were deleted that were multi-interpretable, subject to personal interpretation, and for which data collection was perceived to be too difficult. Similar indicators were merged into one normalised formulation that would allow for comparison among universities. Subsequently, all remaining indicators were categorised by the seven categories of the HEInnovate framework as used in this dissertation and clustered by whether they were measuring input, throughput, output or outcome of an entrepreneurial university. An overview of all these indicators is presented in annex six of this dissertation.

The majority of these remaining indicators are output indicators related to knowledge generation and collaboration between university and businesses, mirroring the attention in literature for technology transfer and knowledge-based start-ups as dominant aspects of an entrepreneurial university (Etzkowitz, 2004; Audretsch, 2014). Almost fully absent in the overview of indicators are indicators on leadership and strategy, which is probably because these pertinent variables are difficult to quantify in a scalable, university comparable manner.

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	Input	Throughput	Output	Impact
Leadership and governance	Number of industry/ business representatives in the university external advisory board			
Organizational capacity	Number of dual appointments (industry / academic) – teachers having both positions in university and in a business	Number of research fellows (post-graduate students and postdocs funded by scholarships)	Total income from international collaboration	
	Number of staff employed for talent attraction, executive education, and incubation, as percentage of total number of staff	Total R&D expenditures	Total income from business and community interaction (collaborative research, contract research, consultancy, facilities and equipment, executive training, regeneration and development, IP income, sale of shares in spin-offs)	
			Total funding generated by the university through spin-offs, business development services, and joint ventures	
			Total amount of revenues from start-up portfolio during the last year, including licence incomes, cashed-in equity, and R&D funds from start-ups	
			Total external funding of university research	
			Total financial volume of industry funding of university research	
			Total income from royalties	
Entrepreneurial Teaching and Learning	Number of entrepreneurship courses offered (undergraduate and graduate level)	Number of students taking entrepreneurship courses		Gross Value Added in the region (GVA)
	Number of training/ certification programs on/related to entrepreneurship and innovation (extra-curricular)	Number of students participating in extracurricular entrepreneurship activities		Employment rate of graduates, 1 year after graduation
		Total number of students participating in internships		
		Number of industry based student diploma works		
		Number of student internships at business enterprises		

		Numbers of student organizations that undertake entrepreneurship related activities		
Preparing & Supporting Entrepreneurs	Number of FTEs dedicated to encourage and support start-up activity, including technical and administrative staff	Number of business incubators (co-)owned by the university	Number of entrepreneurs among graduates	Number of start-ups and spin-offs founded or co-founded by graduates, staff or students still active after more than 3 years
	Number of technical FTEs dedicated to support start-ups with more than 2 years of experience	Total amount of university expenditures made to encourage and support start-up activity, during the last year	Number of entrepreneurs among university staff	Estimated number of jobs of all active start-ups and spin-offs founded or co-founded by graduates, staff or students
		Number of business ideas and plans presented during the last year	Number of student start-ups formed	Total estimated number of jobs of the companies in Business & Science Park (co-)owned by the university
		Number of potential entrepreneurs enrolled in a business start-up assistance programme	Number of all active firms (co-) owned by the university	Total estimated turnover of all active companies (co-) owned by the university
		Number of business ideas and plans with international approaches presented during the last year	Number of university spin-offs with share of the university	Total estimated turnover of all active start-ups and spin-offs founded or co-founded by graduates, staff or students
			Number of firms using services of the business incubators (co-)owned by the university	Number of awards received
			Number of start-ups and spin-offs founded or co-founded by graduates, staff or students	Gross Value Added in the region (GVA)
			Number of all active start-ups/spin-offs founded or co-founded by graduates, staff or students	Percentage of the local/regional GDP generated by start-up portfolio
			Number of academic staff involved in active start-ups	Retention rate of university spin-off companies
			Number of active start-ups	
			Number of licenses executed to new start-ups	Number of jobs (FTEs) created from the start-up portfolio, involving undergraduates, graduates, PhDs, and academic staff of the university
			Number of academic staff involved in start-ups formed	Number of jobs (FTEs) created from the global start-up portfolio during the last year, involving undergraduates, graduates, PhDs, and academic staff of the university
			Number of active start-ups with university equity holding	Total number of jobs (FTEs) created by active start-ups

			Value of the university equity in active start-ups	Number of new products/processes/ services introduced to the market by start-up portfolio
			Number of start-up exits via IPO (initial public offering) or MBO (management buy-out)	Total amount of turnover from global start-up portfolio generated
			Number of active global start-ups	Total number of jobs (FTEs) created by active global start-ups
			Total amount of revenues from global start-up portfolio, including licence incomes, cashed-in equity, and R&D funds from global start-ups	Number of new products/processes/ services introduced to the market by global start-up portfolio
			Total amount of foreign investments made to start-ups	
Knowledge exchange & Collaboration	Number of fulltime equivalent professionals working in a TTO/ industry-university cooperation unit	Number of (Business &) Science Parks with which the university is formally cooperating	Number of patents, licenses, trademarks, industrial design (nationally or internationally) co-owned by the university	Gross Value Added in the region (GVA)
	Presence of a IPR policy	Number of university-industry collaboration projects	Total value (USD or Euro) of research collaborations, contracts, and consultancies	Number of citations that the university has received
		Number of academic staff trained on IPR, divided by total number of staff	Number of public–private co-authored research articles	
		Total legal expenditures on protection of IPR	Number of extention, community service projects	
		Success rate of R&D project applications	Number of national or international scientific prizes and rewards received	
		Number of events organized by the university that are open to the community/public	Number of research, consulting or other service contracts	
		Number of organizations, companies, institutions (excluding higher education institutions) involved into formal agreement with the university	Number of post-doctoral students carrying out research in private companies	
		Estimated number of partnerships with private sector and government, whether local, regional, national, or international	Number of patent applications	
		Number of companies in a university based technology park (Science Park)	New international patent applications	

		Number of joint university-industry centers, labs, educational programs and institutes	Number of patents granted	
		Number of invention disclosures	New international patents granted	
			Patent portfolio (number of active patents)	
			International patents' portfolio (number of active patents)	
			Number of laboratories or buildings that are formally shared by the university and one or more private companies	
			Number of companies co-funding research or education activities	
			Number of corporate clients for training and educational services of their staff	
			Number of museum centres managed or co-managed with the university	
			Number of SCI-covered publications during the last year	
			New scientific publications	
Internationalisation	Number of technical FTEs dedicated to support international new ventures with more than 2 years of experience		Number of students engaged in inward international mobility	Number of international co-authored publications
			Number of students engaged in outward international mobility	
			Number of staff engaged in inward international mobility	
			Number of staff engaged in outward international mobility	
			Number of joint international research projects	
			Number of scientific journals with university staff serving on editorial boards	
			Number of international joint degree programs	

Options for normalisation of the above mentioned indicators found in literature

T= time of measurement	**Normalisation**
End of last year	By number of members of the university external advisory board

During last year (12 months)	By number of academic staff
During last 3 years	By number of staff
Measured over a period of 5 years	By number of students
1 year after graduation	By the country's population
2 years after the period of analysis (t+2)	By total university expenditures
	By total annual university budget
	By total amount of reseach expenditures
	By total annual research budget
	By origin of income: Licenses (tax fees and royalties); Equity holdings (cash in equity); R&D funds from start-ups
	By total number of courses
	By number of internships
	By number of patent applications
	By total number of patents
	By number of start-ups formed during last year (12 months)
	By number of start-ups formed during last n years (n = 1,2, 3, 4 or 5)
	By total number of active start-ups
	By number of spin-offs and start-ups
	By number of global start-ups
	By the number of companies in Business & Science Park (co-)owned by the university
	By the number of active companies (co-) owned by the university

Appendix VII. Valorisation of this PhD research

In the Netherlands, the attention for entrepreneurial universities has culminated in the concept of valorisation. This is defined as *'the process of creating value from knowledge by making knowledge suitable and/or available for economic and/or societal use by translating knowledge into useful products, services, processes and entrepreneurial activity'* (Landelijke Commissie Valorisatie, 2011: p8).

This dissertation is about the societal role of universities in developing countries, in particular related to entrepreneurship and youth employment. In a multiple case study, the entrepreneurial status of universities in Ethiopia, Indonesia and the Palestinian Territories was researched. As such, it explores how the universities studied valorise their knowledge for the benefit of the society in which they operate, and how this could be improved.

In this addendum to the dissertation, parallels with a recent study on valorisation in the Netherlands are highlighted, after which contributions of this thesis to the Dutch valorisation debate are made explicit. Last, some concrete services and activities or commercial activities are proposed that may derive from this dissertation.

Supporting entrepreneurship in higher education

In 2018, the OECD published a study on the impact of Dutch higher education institutions on entrepreneurship and innovation (OECD and European Commission, 2018). It encompassed a multiple case study of nine institutions (seven universities and two universities of applied sciences) and an online survey to the executive boards of all publicly funded higher education institutions in the Netherlands. In essence, this study was about the valorisation policies and practices of higher education in the Netherlands. Key aspects of the valorisation agenda in the Netherlands are supporting startups by staff and students and offering entrepreneurship education. The OECD study demonstrates that many activities in this area are taken place at Dutch universities, resulting in a set of recommendations.

Although the situation in the Netherlands is different from in the three countries covered in this dissertation, parallels exist. As such, the lessons learnt as formulated in this dissertation can contribute to improving the policies and practices in the Netherlands, and the other way round: the recommendations by the OECD for the Netherlands can be of use for higher education in Ethiopia, Indonesia and Palestine. A clear parallel is the lack of synergy between valorisation or entrepreneurship activities at one hand, and education and research at the other. The OECD study calls upon strengthening coordination mechanisms amongst the different relevant ministries, whilst the dissertation makes mention of the need for coordination within the university. Also other weaker aspects in the Netherlands appear to be equally in need for improvement in the countries studied in this PhD research. To mention

training of staff, involvement of students, strengthening entrepreneurship centres, and a focus on high-potential start-ups. This dissertation points to entrepreneurial leadership of universities as important enabling factor for helping to overcome these weaker aspects.

In other respects, experiences are different. Policy makers and university leaders in the Netherlands could learn from their colleagues in developing countries how to structurally embed community service in education and research. This dissertation has made clear that in Ethiopia, Indonesia and Palestine there are many activities in support of the communities surrounding the universities. Local communities are offered training and services free of charge, support by groups of students, and academic staff is running community development projects. Examples have been found of community service as compulsory elements of degree programmes. These practices are different from the practice in the Netherlands in which economic valorisation prevails as an add-on to education and research. Learning opportunities are also the other way round: policy makers and university leaders in developing countries could learn from their Dutch colleagues how to incorporate economic aspects in community development.

Researching valorisation: HEInnovate

Just like in this PhD research, the HEInnovate framework (European Commission and OECD, 2013) with its seven categories was used to assess the universities' policies and practices in the Netherlands. HEInnovate is an online self-assessment tool developed for European universities by the European Commission's Directorate General for Education and Culture together with the OECD Local Economic and Employment Development Programme (LEED). HEInnovate proves to be useful in comparing universities, in particular universities operating in a similar national context. This is evidenced by both this PhD research as well as the OECD study among the Dutch universities.

Even more, beyond its original application for higher education institutions in Europe, this dissertation concludes that HEInnovate is also applicable as assessment framework for universities beyond Europe, in this case Ethiopia, Indonesia and Palestine. This opens the door for comparing higher education globally on valorisation policies and practices, among which supporting start-ups and offering entrepreneurship education. Thus it can be concluded that HEInnovate is validated as framework to assess valorisation policies and practices of universities, whether in the Netherlands or beyond, and as such is relevant for carrying out research aiming at exploring lessons learnt on valorisation in different countries.

HEInnovate however has its limitations as explained in this dissertation. The magnitude of the framework complicates data collection and – analysis. Furthermore, it is less conducive for measuring entrepreneurial characteristics in a quantifiable, comparative manner, capturing a transformation process or relating developments within the university to the ecosystem in

which it operates. Both studies therefore carried out a mixed method research to address these limitations. Data were collected through various data sources, which allowed for triangulation. Similar to this PhD research, the OECD study in the Netherlands combined a perception based survey using the HEInnovate statements with interviews with a multitude of stakeholders. In addition, this dissertation recommends to give more attention to non-economic aspects of valorisation, which were prominent in the universities assessed in this PhD research.

Measuring impact

An important finding of both the assessment of the Dutch institutions as well as this dissertation, is that there is need for a common set of indicators, in particular to measure impact of valorisation. An internationally agreed set of indicators measuring entrepreneurial universities does not exist (Etzkowitz, Bikkulov, Kovaleinen, Grey, Leitner and Poutanen, 2017), because of the variety of interpretations and manifestations of entrepreneurial university. The same applies to valorisation that takes many forms. The OECD study concludes that each university in the Netherlands has its own way of reporting on its valorisation activities and results, using self-selected indicators.

This directly touches upon an important limitation of HEInnovate as evidenced in this PhD research. The dissertation shows that HEInnovate in its current form is not fit for measuring impact. The focus of HEInnovate is on assessing inputs and throughputs with the aim to improve the (entrepreneurial) functioning of a university. The framework assumes a relation between these inputs, throughputs and possible outputs and outcomes, but as such is not measuring these interrelations. Therefore it is recommended in this thesis to compliment HEInnovate by a model linking inputs, throughput, outputs and impacts of an entrepreneurial university.

Beyond this recommendation, this PhD research as well contributes to the quest for (impact) indicators. Studies have been analysed in search of non-perception based indicators that could be used to measure input, throughput, output or outcome of an entrepreneurial university. In this meta-analysis, 101 peer-reviewed articles on entrepreneurial universities indexed in two EBSCO databases were examined, complimented by 11 purposefully selected articles based on the literature review of the four empirical studies in this dissertation. In addition, quantifiable indicators as described by the international working group on Global Entrepreneurial University Metrics (GEUM) were added (Etzkowitz et al., 2017).

The following guidelines were used for the selection of indicators: i) availability, using existing data where possible; ii) efficiency, using existing university procedures to generate data; iii) simplicity, without the need for complicated mathematical calculations; iv) comparable, non-perception based; and v) scalable to total number of staff, students or other. This resulted in 280 non-perception based indicators that were found in 21 articles. Subsequently, indicators

were deleted that were multi-interpretable, subject to personal interpretation, and for which data collection was perceived to be too difficult. Similar indicators were merged into one normalised formulation that would allow for comparison among universities. Subsequently, all remaining indicators were categorised by the seven categories of the HEInnovate framework as used in this dissertation and clustered by whether they were measuring input, throughput, output or outcome of an entrepreneurial university. An overview of all these indicators is presented in appendix six of this dissertation.

The majority of these remaining indicators are output indicators related to knowledge generation and collaboration between university and businesses, mirroring the attention in literature for technology transfer and knowledge-based start-ups as dominant aspects of an entrepreneurial university (Etzkowitz, 2004; Audretsch, 2014). Almost fully absent in the overview of indicators are indicators on leadership and strategy, which is probably because these pertinent variables are difficult to quantify in a scalable, university comparable manner. Table 1 lists the impact indicators found in the meta-analysis of the 113 articles, grouped by the appropriate category of HEInnovate.

Table 1: Proposed non-perception based impact indicators, grouped by HEInnovate category

HEInnovate category	Impact indicator found in meta-analysis
Leadership and governance	None
Organisational capacity	None
Entrepreneurial Teaching and Learning	Gross Value Added in the region (GVA)
	Employment rate of graduates, 1 year after graduation
Preparing and Supporting Entrepreneurs	Number of start-ups and spin-offs founded or co-founded by graduates, staff or students still active after more than 3 years
	Estimated number of jobs of all active start-ups and spin-offs founded or co-founded by graduates, staff or students
	Total estimated number of jobs of the companies in Business & Science Park (co-)owned by the university
	Total estimated turnover of all active companies (co-) owned by the university
	Total estimated turnover of all active start-ups and spin-offs founded or co-founded by graduates, staff or students
	Number of awards received
	Gross Value Added in the region (GVA)
	Percentage of the local/regional GDP generated by start-up portfolio
	Retention rate of university spin-off companies
	Number of jobs (FTEs) created from the start-up portfolio, involving undergraduates, graduates, PhDs, and academic staff of the university
	Number of jobs (FTEs) created from the global start-up portfolio during the last year, involving undergraduates, graduates, PhDs, and academic staff of the university
	Total number of jobs (FTEs) created by active start-ups
	Number of new products/processes/services introduced to the market by start-up portfolio
	Total amount of turnover from global start-up portfolio generated
	Total number of jobs (FTEs) created by active global start-ups
	Number of new products/processes/services introduced to the market by global start-up portfolio
Knowledge exchange and Collaboration	Gross Value Added in the region (GVA)
	Number of citations that the university has received
Internationalisation	Number of international co-authored publications

Source: author

Training, consultancy and networking

Beyond the option to carry out applied research on the impact of valorisation by using (some of) the indicators as listed in table 1 and by using HEInnovate to compare universities globally, the research as undertaken for this dissertation is and has been the base for training, consultancy and networking for university leaders globally. It fits Maastricht School of Management (MSM) as a leading provider of management education with worldwide presence to deliver these services[21]. MSM's mission is to enhance the management capacity of professionals and organisations in and for emerging economies and developing countries with the objective to substantially contribute to the development of these societies.

Executive training

An open-enrollment training programme of four to five days can be developed, fee based. Such a training workshop would aim to contribute to improved management and leadership, specifically related to strategic planning in general and to strategic aspects of entrepreneurial universities. It would target university middle management responsible for medium to long term integrated planning and results of (entities within) the university. The overall objective of the training workshop would be to increase participants' knowledge and understanding of entrepreneurial universities, to provide them with tools for assessment and prepare a plan for enhancing entrepreneurship at the university or their specific department. Training participants and their respective institutions would benefit from the achievement of the following key objectives:

1. To enhance knowledge on 'Entrepreneurial University'
2. To accurately assess the entrepreneurial transformation needs of individual institutions.
3. To produce a (draft) entrepreneurial transformation plan appropriate for these institutions.

Possible topics are:

- Latest concepts on entrepreneurial higher education institutions
- Tools for organizational assessment
- Best practices of experiences world-wide
- Entrepreneurship education, business development support, and incubation
- International perspectives and linkages
- Entering partnerships beyond the Triple helix
- The role of academia vis-à-vis business, government, and civil society in achieving social, economic and cultural development.

[21]The PhD candidate is senior project consultant of Maastricht School of Management.

Outline of a possible daily schedule[22]

Day 1	Day 2	Day 3	Day 4	Day 5
Introduction of the programme Introduction of the participants and institutional profiles Entrepreneurship, Entrepreneurial attributes, Entrepreneurial Universities Introducing the different concepts, historical and global perspective.	Entrepreneurial University Assessment Explanation of different frameworks Online assessment with HEInnovate: a learning exercise	Entrepreneurial Teaching and Learning Preparing and Supporting Entrepreneurs	Institutional transformation: Leadership and Governance Organizational capacity: finance, people, incentives	Action planning, finalisation
Lunch	Lunch	Lunch	Lunch	Lunch
Imperatives for change: Discussion on why academic institutions want to change. Inventory of current strengths/weaknesses, ambition level	Work visit	Work visit, for instance to a university entrepreneurship centre	Knowledge Exchange and Collaboration Action planning	Synthesising: What are the implications for your institution? Evaluation Closure

Consultancy

A second service that could be offered, is consultancy to leadership of a specific higher education institution in a developing country, to government officials responsible for local or regional economic development, or to business representatives. This is timely, because in many developing countries, topics of entrepreneurship, university – industry relations, youth employment, and Triple Helix get a lot of attention. This is the time for policy decisions and allocation of budgets.

Consultancy for a higher education institution could be aimed at developing a tailored action plan on how it could improve its support to entrepreneurship and youth development, based on a participatory assessment of its organisation, education, facilities, relations with industry, etcetera. Such a consultancy process could best include a workshop in which the university would present its ideas to the most relevant external stakeholders for validation and for getting support.

Besides supporting higher education institutions, another option would be to assist government institutions in reviewing and improving their approaches towards entrepreneurship development and youth employment. This could have two – interrelated – foci. The first is on how to improve the entrepreneurial ecosystem, in particular the role of the different formal institutions, including the higher education institutions. The second

[22]This outline is based on a schedule of training workshops delivered in 2017 and 2018.

angle would be on improving a strategic, collaborative approach towards local or regional economic development. Consultancy could be offered on how to improve the relations between higher education institutions, private sector, government institutions, and relevant civil society organisations. Advise could be given on how to set-up a locally contextualised Triple Helix.

The third target group, business representatives, could be offered assistance in how better cooperate with knowledge institutes as a way to get better access to appropriate technology and skilled labour. This could for instance entail advising on and assisting with the set-up of apprenticeship programmes together with knowledge institutes.

Networking

The comparison between the findings and conclusions of this dissertation and the results of the OECD review of the Dutch valorisation activities demonstrates that universities globally are working towards stimulating entrepreneurship and economic development, although within different contexts. University administrators in one country could learn a lot from their peers in another country. This calls for facilitating learning networks among peers and cross-country research. Possible modalities are for instance (academic) conferences, joint research, roundtable discussions, exchange programmes, and repositories of case studies. The HEInnovate initiative of the OECD and European Commission already stimulates this networking in Europe. This dissertation clearly evidences that it is high time to broadening this networking beyond the OECD member states.

Last, experiences of MSM have demonstrated that it is realistic to offer the proposed services commercially. In 2017/2018 above 100,000 Euro has been generated through open enrollment training in the Netherlands and in Indonesia and through consultancy to a university in Ghana.

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Appendix VIII. Quotes from interviews and focus group discussions

Chapter 2. Entrepreneurial university transformation in Indonesia: a comprehensive assessment of IPB

University leadership

There is no explanation of IPB entrepreneurial mission	FGD students
IPB is still in the process. This year program is reputable innovation, where we encourage community to adopt the innovation. The other one is by creating science park and incubators. IPB also include entrepreneurship as compulsory subject.	Vice Rector
IPB needs more or less about five years to become really entrepreneurial. I am optimistic.	Dean
Vision, mission, grand design and strategy are not dispersed well.	FGD faculty
I feel that socialization in IPB is not going on. Sometimes it is only given to top management. And sometimes top management do something without consultation and socialization. Leadership never gives example. Entrepreneurial university is still defined by hearsay.	FGD entrepreneurship teachers
Some staff at IPB do not know what is being entrepreneurial university means. They only think about having/doing other businesses.	FGD entrepreneurship teachers
IPB just let staff do what they want, no guidance. IPB Is not giving us spirit and training.	FGD faculty
All faculties must adopt entrepreneurial spirit, not in the curricula but more in co-curricula.	Vice Rector
Based on our alumni, who became leaders in many industries, entrepreneur as spirit is already there at IPB.	FGD faculty
I think we still stuck on indicators of teaching and publication only. But things are changing fast now and we need to adapt.	Vice Rector
Entrepreneurship is good, as side job, but faculty has to do the main job as researcher/ education	Dean
I see IPB changing, where change is very difficult to accelerate. Maybe it is a good thing, where the evolution is smooth, comparing to other universities. IPB is reluctant to change because two factors: external the government is not adapted to that change (ie budget, curricula); internal side, we always got the shadow of history, where we are the institution of agriculture, it is difficult to change from agriculture to agribusiness/industry.	Alumnus, former Minister
If we look at the documents, you will see the concept is actually progressive in many ways, but to implement that is not easy for IPB.	Alumnus, former Minister
Sometimes academicians think they are better. It is not about arrogance, but it is more overconfident. It is also too depending on the rector, when the leader changes than the direction of the relationship change.	Business leader
IPB has all the resources to be Entrepreneurial University, but they need to integrate all the resources to go in the same direction.	Business leader
I see that IPB still have narrow minded view of entrepreneurial. We only sell the result of our innovation.	Dean

Research-based commercialisation

At IPB Entrepreneurship development is based on innovation process of technology development	Vice Rector
Efforts are geared towards increased commercialization of IPB inventions.	Vice Rector Research
Indicators of success are: 1. Commercialization of innovation; 2. Adopted innovation; 3. Good connection between education, research and entrepreneurial activity, so the student will have more exposure on entrepreneurship.	Vice Rector
Staff is always encouraged to do research that has the potential to be commercialized. In each department, we encourage to innovate, LPPM sends info to all lecturers about possibility of funding to innovate. LPPM is trying to put the first priority for applied science. IPB also allocate the budget for incubation and commercialization. Currently less funding for basic research than in the past.	Research directorate staff
There is lack of support at IPB for staff doing business, IPB is not providing doors to open. Sometimes if we get open door than the IPB leadership suddenly comes and makes it difficult.	Faculty member

In terms of commercialization, what we should improve is we have to collaborate as of the start of the research and then the industry can share with us what they really need and how we can provide them what they need	Dean
Not much of our research is based on industry needs.	FGD faculty
There is direct promotion of IPB research to industry. This is not a new development, but it is becoming more intensive. Last year a special promotion event has been organized for this purpose in Jakarta	Director External relations
In Indonesia, companies are not willing to work with universities, so we built our own company, more as a bargaining position with the business community.	Rector
There is no sharing of facilities too. The industry progress is more advanced than the university and government.	Business leader
The relationship of IPB and private sector is not mutual, it is more IPB need their support. Many individuals have done good, but as an institution is not.	Alumnus, former Minister
In daily life, industry has so many problems, but IPB not work on it. And from the industry, there is lack of will to work together with IPB.	Business leader
We have very good relationship with IPB. Both sides are benefiting from the relation in terms of graduate placing, research, community development	Business leader
Even though lots of smart influencing people from IPB (even become minister), IPB is not present in the business sector and doesn't offer a lot for the industry.	Business leader
I think IPB needs to be more open to the new ideas from real businessmen. From my experience, many business people enjoy teaching and research, and they don't mind spending some money for it. That is why collaboration is important.	Business leader
So far, IPB hasn't been good enough in commercialization due to the innovations are not interesting enough for the industry.	Business leader

Learning and teaching processes

When we meet student affairs, they always say that there is no fund. The support mechanism is complicated, and students have to meet a lot of people just to get fund.	FGD students
We experience lack of application, lack of follow up after field study, lack of critical thinking challenges, lack of interaction and discussion, lack of learning in industry	FGD students
There are many student business, but they discontinue upon graduation: the purpose is mainly to generate income during the study because the scholarship is limited.	FGD students
Sometimes we have a guest lecture. Guest lectures give us many benefits such as: open our career horizon, get motivated, stories of industry, extra knowledge activities	FGD students
IPB is not providing enough internships. We also have lack of time because of other academic activities	FGD students
To transfer entrepreneurial spirit is not easy. Most lecturers are just thinking about teaching in their field. But now we ask lecturers to complete the student with entrepreneurial spirit in order to excel in competition. It is not translated yet into formal KPI	Vice Rector
Staff is consulting students on running their business. We have trainings, seminar and talkshow for staff and students	FGD faculty agribusiness department
We are guiding our students to be more of risk taker, can see opportunity, and creative. I am not satisfied with the implementation.	Dean
We are successful of attracting some alumni to give us fund to buy more practice materials. We also invite them to meet the lecturers to help us developing teaching method. Our alumni like to contribute to work with our students and staffs.	Dean
At this moment, we are guiding our students to be more of risk taker, can see opportunity, and creative.	Dean
Students think that entrepreneurship means create money, but it is more on creating value.	Dean
Each course in IPB should contain entrepreneurial goals. Such as the student has to create something and sell it. We can combine formal and informal education.	Dean
If the faculty would like to encourage the students to be more entrepreneur than the faculty need to be entrepreneur in agroindustry as well.	Business leader
IPB is still far from being entrepreneurial. The students' entrepreneurial spirit/characters are not there yet. IPB has not encouraged students enough to be more entrepreneurial.	Business leader

Chapter 3. Entrepreneurial Change in Government-led Development: Ethiopian Universities

Leadership and Governance

The top leadership is not open, not willing to offer support to students	FGD students university6
introduction of harmonized curriculum and recruitment of academic staff by the ministry is limiting the university performance	President university1
For those who have succeeded there is no praise. This culture has to change	FGD faculty university2
A department is waiting for a commandment by another department, leadership or ministry	FGD faculty university6
I am in favour of supporting students to start-up a business. This has happened already a bit, and will become more structural under the new Entrepreneurship Development Center.	President university3
The overall entrepreneurial spirit in the university is poor. The university top management is not committed to support the entrepreneurship development because they are not aware of it	FGD faculty university4
Entrepreneurial initiatives are not from university , it is only from the ministry so far	FGD faculty university4

Organisational capacity

The university is a reflection of the environment: lack of housing for staff, lack of vehicles, lack of infrastructure	Vice President university6
The university has set up a university enterprise to create revenues, legally registered.	President university3
Instructors discourage new initiatives and projects of students when they feel that it challenges them	FGD students university4
The university is not autonomous by itself. Political interference in the management of the university is very high	FGD faculty university5
Cooperation among units is difficult because lack of awareness and lack of clarity in the work relationship among different units.	FGD faculty university8
The university does not have budget to build entrepreneurial capacity of staff	FGD faculty university8
The culture to bring new initiatives in general is poor	FGD students university8

Entrepreneurial Teaching and Learning

Education is not good here: we found information better on the internet. my little brother knows more than the teacher	Young entrepreneur
We finished entrepreneurship course with only 2 days lecture so we don't have even understanding of the course though it is important (Instructors regularly miss class)	FGD students university1
The course is just given for the sake of offering it and does not have impact in changing attitude of students	FGD students university1
There is not enough attention for entrepreneurship development. Training is very very important part. For heaven sake, you need to retrain the graduates	Senior businessman
Skill level for practical engagement is missing among graduates; this is also not offered by the lecturers.	Vice President university2
Last three years: we bring in entrepreneurs, once a year, like inspriration days	FGD faculty university2
I want to introduce experiential learning, but senate legislation holds me back	FGD faculty university2
We need that people show their experience. It is not happening for us, but we need it	FGD students university2
Staff capacity, lack of interest and absence of facilities are challenges that hinder entrepreneurship development	FGD faculty university4
The university somehow is supporting internship, but duration is not enough and it is not timely	FGD students university4
The lecturers did not have any entrepreneurial experience. And if they may have such experience, it was not shared in the course.	FGD students university7
I try to encourage my students to become more entrepreneurs, so many opportunities	FGD faculty university7

Preparing and Supporting Entrepreneurs

Entrepreneurship is very important, target for students to create their own work, not only in business department	FGD faculty university6
Students made a formal request. The answer was no, no budget allotted for this. Students have no idea whom to ask for what, what budget may be available, which procedures	FGD students university6
University is not good enough in taking initiatives from students	FGD externals university1
University shows nothing to support us	FGD students university1
The conducive environment is missing, there is no access to seed money.	Senior businessman
Most of the university staff is engaged in other business, because costs of living are too high	FGD faculty university2
This year there is a business plan competition, 3 will get a reward	FGD faculty university2
There is a lot of bureaucracy, need to understand the structure of the organization, do not really know where to go. And when you know, people not always wiling to cooperate, tendency to deny	FGD students university2
We want to start as soon as possible with a Business Plan Competition. This however need some budget, in particular for the rewards of the winning proposals. This budget is not yet assured, but the university management is positive.	Director Entrepreneurship Centre university3
We have requested the university to start business but that was refused	FGD students university4
The university provides us with working place for a small business	FGD students university5
Entrepreneurship is a new field, we need to bring in a positive, compassionate imagine	Senior faculty member university2

Knowledge Exchange and Collaboration

The university has given deaf years to the initiatives from the stakeholders several times	FGD externals university1
People think about big factories, but they have a wrong perception. The area in itself has no much industries	Vice President university6
Lecturers should be a role model, starting business around the campus. But that is not happening, in business around campus nobody of university is involved	FGD externals university6
Transport is a major challenge. Cash is needed. Too little time for departments. Lack of commitment in the institution	FGD faculty university6
The faculty has relationship with external stakeholders but it's fragmented and not well structured.	FGD faculty university3
The university has an important role in the local and regional development activities: creating human capacity, offering employment, and creation of a market.	FGD externals university3
There is no cooperation (support) between the university and entrepreneurs in town	FGD externals university3
The university has no relationship with the Micro finance, SMES, women entrepreneurs, and chambers at all so far	FGD externals university4
The experiences of successful entrepreneurs is shared with students but not often and not in a systematized approach.	FGD externals university5
The university does not look committed to cooperate with the private sector stakeholders	FGD externals university5
The university financially supported the city to conduct trainings for the youth in the city. But there was no technical support	FGD externals university6
Yes, cooperation is important but hardly happening	Senior faculty university2
We have agreement with different regional government organizations for training of staff and teacher training	President university6

Impact measurement

We do not have impact data /tracer info yet. Informally we know, but not I a structural way	FGD faculty university1
The system of measuring expected learning outcomes of programs is not in place.	FGD leadership university5

Chapter 4. Universities in the complex setting of the West Bank: entrepreneurial or engaged?

An-Najah National University

We are planning to be an entrepreneurial university. We know that we are lagging behind.	FGD leadership
We cannot attract international students or faculty due to the occupation and high potentials seek jobs outside Palestine	FGD leadership
If a student has the desire for development of the skills, ANNU offers many opportunities.	Faculty member
Universities and the private sector point fingers to each other, but that is everywhere. But here the cake is small. And there is competition for the same money: the university needs money, the same money private sector needs. Companies want to have the ideal graduate.	Director incubator
ANNU is bureaucratic and hierarchical. For example, the financial department is only willing to be of help if asked by the Presidency.	FGD faculty
I went to two courses and a bootcamp, all organized by the student society branch. It helped to engage with private sector	FGD students
ANNU is not focusing on leadership, entrepreneurship -> I find that beyond ANNU	FGD students
At ANNU education is only theory focused in class, with a few labs to practice the theory.	FGD students
I think we have much support, but we are graduated in a closed community. This needs to be more open.	FGD students
The largest support is mainly outside ANNU: skills development is mainly among the students	FGD students

Al-Quds University

The strategy aims to link the academic process of AQU more closely to the (inter)national market and community needs. AQU wants to contribute to employment of graduates and technology transfer	President
We receive no income from the Palestinian Authority, which makes us dependent on tuition fees, project funding and charity	President
Student needs to be entrepreneurial in order to survive	Vice President
AQU as a whole still lacks the strategy for moving to a more entrepreneurial university	Head institute
We need to be entrepreneurial, to be more competitive under occupation. If AQU is not attracting students, hence is not getting income out of tuition fees, AQU will cease to exist.	Head institute
Currently entrepreneurship is seen as the option for solving the unemployment crisis. Most of the donors are selling this as the solution.	Dean
AQU is struggling in many ways, thus it has something entrepreneurially to be able to attract students.	Faculty member
No one is preparing us to find a job, only certificate, that's it. Many friends did not find a job	FGD students
Starting a business is tough because you need money, and because of the occupation people are not so willing to invest	FGD students
Depends on the prof, is not a university thing. Some prof cannot help anyone.	FGD students
There is no course for critical thinking, entrepreneurial skills are not given attention.	FGD students

Hebron University

May be we are behind other universities, we are new in this business of student entrepreneurship and start-ups	Dean
HU helps to apply the knowledge in the sector	FGD students
We study more than we practice, it could be better	FGD students
HU tries to fit the graduates with the market needs, but we need to offer more practical education	Dean
HU has many partnerships. It is essential to connect because are in a small country and under occupation. HU also tries to connect to the companies locally.	Dean
A few years ago, there was a business fair on campus, but the only link to the university was that the premises were used	Dean
I am looking for a comprehensive change, to become entrepreneurial university. I try to encourage new initiatives	President
HU is believed to have the ability to educate girls	Faculty member
Business start-up example: 1. HU helped to get some funding for this start-up	Faculty member
We are now very much focusing on needs in the economy, we try to fit the graduates with the market needs	Dean

Palestine Technical University Kadoorie

We are looking forward to become entrepreneurial university	President
We are reforming curricula to embed entrepreneurship, creativity, think critically	President
Business contribution is very limited because there is hardly business	President
What are entrepreneurial skills? I do not understand	FGD students
We get support to have job / project, but by individual teachers. University not responsible	FGD students
Within 2 to 3 years 'you will see a revolution in this issue' (referring to spin-offs and students start-ups). We are responsible for servicing our community	FGD leadership
We are in process of changing educational system, integrating students with the industry, developing our laboratories, also practical knowledge, sometimes guest lectures.	FGD leadership
We are not there yet, not yet an entrepreneurial university, but we are definitely working towards it.	FGD leadership
Leaning students to start-up their own business is a must, because the local industry not big enough to absorb our students	FGD leadership